AMERICAN ARTISAN

RESIDENTIAL AIR CONDITIONING
WARM AIR HEATING - - SHEET METAL CONTRACTING

FEBRUARY 1944

Fabrication Methods to Produce Thousands of Bomb Fins Daily - - - Page 63
How to Do Maintenance and Repair Work under New L-79 - - - - - Page 36
Hydro-Press (Rubber dies) Forming of Small Parts - - - - - - - - - Page 72

The Lamneck Jobber says: "I'M GOING TO START GETTING SOME LAMNECK FURNACE PIPE AND FITTINGS SOON"

"Yes, that's true and I know that all you go-getting Metal-Shop Owners are going to be pleased with this news. It means that, before very long, I'll be able to serve you once again . . . maybe not with *all* you want and need; but with some, at least.

"The fact that our Government is recognizing certain civilian needs indicates that our steel mills are over the hump . . . and are turning out metal for pipe and fittings. The Government likewise sees the saving in manpower and materials where Lamneck products are used.

"I bring you this important message because I know that you . . . and hundreds of other loyal Lamneck enthusiasts . . . will want all the help you can get from me as your faithful Lamneck Jobber. So be patient. The time is not far off!"

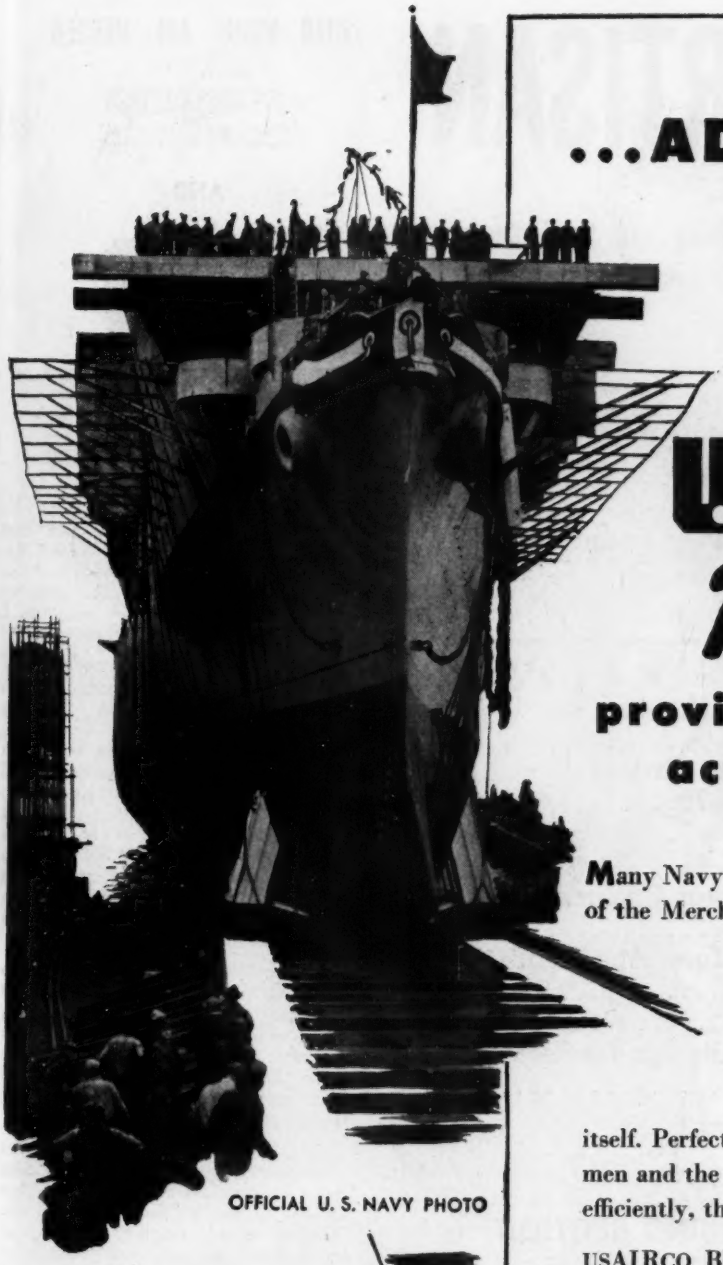
REMEMBER! Your Lamneck Jobber has been trying to service you as much as possible, even though he hasn't been able to obtain your favorite Lamneck Products. Now he's getting ready to serve you once again. Keep in close touch with him . . . so you can serve yourself and your customers to better advantage!

LP INC.

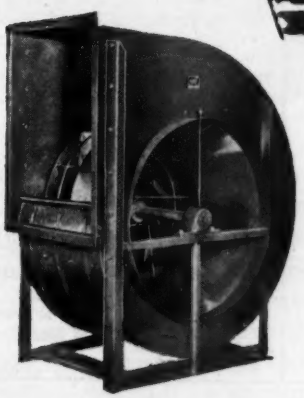
LAMNECK PRODUCTS

MIDDLETOWN, OHIO

...ADD ANOTHER FLAT TOP!



OFFICIAL U. S. NAVY PHOTO



USAIRCO *Blowers*

provide cool air where action is hottest!

Many Navy ships, transports, cargo vessels and tankers of the Merchant Marine are equipped with USAIRCO Blowers. These duty-ready units keep air moving steadily—in storm, in calm, in the heat of battle.

To the working crews in gun turrets and in the boiler rooms, conditioned air is life itself. Perfect ventilation is essential at all times. When men and the machines that surround them are working efficiently, the job gets done quicker.

USAIRCO Blowers meet every test—performing efficiently in many ways—heating, exhausting, and moving conditioned air. These Blowers, as well as unit heaters, coils and air washers are designed by USAIRCO for every type of air handling.

UNITED STATES
AIR CONDITIONING CORPORATION

Manufacturers of the most complete line of air handling equipment. Factory representatives in principal cities.

NORTHWESTERN TERMINAL • MINNEAPOLIS, MINNESOTA

AIR WASHERS
Single, double and triple stage in capacities for every job of air cleaning, cooling, humidifying, dehumidifying.

UNIT HEATERS
Suspended type steam heating units equipped with Deflecto Grilles for distributing heat in any direction.

COILS
Cooling, heating and air conditioning Coils-fin type with high heat transfer efficiency.

"SU" BLOWERS
Type "SU" exhaust fan designed for all applications where direct-driven motor-fan unit is required.

"E" BLOWERS
Typical light duty belt-driven exhaust blower of type approved for exhaust application.

AMERICAN ARTISAN

WITH WHICH ARE MERGED

FURNACES AND SHEET METALS

AND

Warm-Air Heating

Covering All Activities in Residential Air Conditioning and Small Commercial Cooling, Warm Air Heating, Sheet Metal Contracting and Fabricating

J. D. Wilder, Editor — A. A. Kennedy, Assistant Editor

Vol. 113, No. 2 — February, 1944 — Founded 1880

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In This Issue

ON page 32, readers will find part 2 of an unusually practical article on recording and reporting the many business records the government now wants to look at. Part 1 appeared in the January issue.

Men conducting a business today no longer can keep books on the backs of old letters or on scraps of paper. Every month, as the Tax Calendar shows, there is some sort of a report which must be prepared and submitted. While this article is not intended to be a description of a 1944 bookkeeping system, it should be readily apparent that bookkeeping systems more than five years old should now be overhauled and put in order so that these reports can quickly be taken off the ledgers.

This article is set up for the state and city of New York—the number of records and reports will, of course, vary with the state in which you operate, but, in general, almost every state demands something similar. If you haven't put your books in order, by all means do so.

The author of this article—Arthur Roberts—is an accountant who does a lot of service work among members of our trade. We feel sure that Mr. Roberts will be happy to accept questions from readers and incorporate answers in future articles to appear in American Artisan. Send your questions to us and we will transmit them.

• • •

The front cover (U. S. Air Force) shows a bomb fin (page 63) in action.

The photograph used on the cover of the Sheet Metal Section shows a Van Dorn "Scrugun" assembling air conditioning ducts by "running in" self-tapping metal screws, in the shop of J. P. Murdock Co., Philadelphia.

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Check These Features...

You get them all in the NEW QUICKWORK NO. 8 ROTARY SHEAR

1. VARIABLE SPEED DRIVE permits selection of the most efficient operating speed for each type of work.
2. FOOT CONTROL CLUTCH leaves both of the operator's hands free to guide his work.
3. DUAL UPPER CUTTER HEAD CONTROL is achieved through a hand lever for quickly raising or lowering, and a hand crank for fine adjustments and use during flanging operations.
4. ADJUSTABLE WORK LIGHT helps increase operator's accuracy and speed and reduces fatigue.
5. REMOVABLE WORK TABLE allows greater clearance and freedom in trimming odd-shaped pieces.
6. MODERATE PRICE offers economy —the Model 8 is the least costly power-operated shear of its cutting capacity on the market.
7. OTHER OPERATIONS may be performed—special attachments make slitting, circle-cutting, and flanging possible.

Its simplicity and versatility make the Quickwork-Whiting Model 8 Rotary Shear excellent for both general shop work and straight production of standard forms. The Model 8 is fast in operation (10 to 33 feet per minute), accurate, easy to handle, economical, and modern in design. Its capacity, 1/8 inch mild steel.

Particularly useful with aluminum alloy and stainless steel of the types used in the aircraft industry, the Model 8 Shear adapts itself especially to trimming heavy gauge, irregular, straight and irregular cutting and deep drawn stampings. With special attachments which are available as extras, this shear can be used for flanging, joggling, circle-cutting, and slitting. Write for further information.

ARMY E NAVY

QUICKWORK-WHITING DIVISION

WHITING CORPORATION

15699 LATHROP AVENUE, HARVEY, ILL.

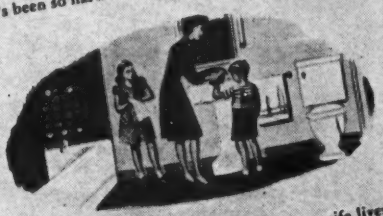
Helping you today..

"These times have certainly taught us the value of copper and brass"

"John says our copper gutters and leaders and chimney flashing are still as good as new. We haven't spent a nickel on upkeep, except for clearing out leaves. And I can vouch for the way bronze screens last—ours are still in *excellent* condition."

"When John and I built our home back in 1935, thank goodness we didn't skimp on tried-and-true materials like brass pipe plumbing and copper gutters. Our home has been a joy, especially during this war period when it's been so hard to replace things."

"And now, we are thinking of building a new home when the war's over—one with a little more ground. We're collecting ideas and laying aside war bonds. One thing sure—there's going to be plenty of copper and brass used. After all, the upkeep we've saved helped pay for plenty of our bonds."



"Just take plumbing—something a housewife lives with 24 hours a day. We've never had a worry with our brass pipes . . . no rust-clogging . . . no rusty-red water. I can't help but realize how fortunate we are when I compare our experience with the Ralston's next door who have had so *much* trouble with rust."

When the red metal gets the green light . . .

Today war needs get first call on all production of copper and copper alloys. But with victory, Anaconda Copper, Brass and Bronze in many forms of usefulness and durability will be waiting for architects and builders. The same type of research that pioneered brass pipe plumbing, that paved the way for low-cost copper tubing, is carrying on now to serve postwar home owners.

LOOK HOW FAR A WAR BOND WILL GO IN MAKING YOUR HOME RUSTPROOF!

In building an average 6 or 7 room house, a one-hundred dollar bond will more than cover the extra cost of:

COPPER tubes for both hot and cold water pipes.

COPPER gutters and leaders.

COPPER flashing around chimney.

BRONZE screens for all windows and doors.

What better investment for one of your bonds? Save today to make your postwar home rustproof.

THE AMERICAN BRASS COMPANY
General Offices: Waterbury 88, Connecticut
Subsidiary of Anaconda Copper Mining Company
In Canada: ANACONDA AMERICAN BRASS LTD., *New Toronto, Ont.*

ANACONDA

Anaconda Copper & Brass

For the days to come

To keep in step with the front rank of the new home builders... to get the CHOICE of the new home jobs ...keep in step with copper and brass

Ads such as this one, appearing in Better Homes and Gardens and in American Home, will be eagerly read and their message *remembered* by those people in your community who will be your *preferred prospects* just as soon as war conditions permit.

Those who have known the security of copper and brass will accept nothing less, and those who have suffered the expense and annoyance of rust and corrosion, will demand copper and brass.

You need the security of copper and brass as much as they.

ANACONDA

4439

Anaconda Copper & Brass

THE AMERICAN BRASS COMPANY

Subsidiary of Anaconda Copper Mining Company

General Offices: Waterbury 88, Connecticut

In Canada: ANACONDA AMERICAN BRASS LTD., *New Toronto, Ont.*

THIS IS

Your Anniversary Too

1914 ★ 1944

Thirty years is a long time to be advertising to the American public. Not many sheet metal contractors can remember "away back when" ARMCO ran its first double-page spread in *The Saturday Evening Post*—in 1914.

Yet many of you have felt the influence of this advertising down through the years—in getting jobs and doing "quality work with quality iron." It has backed up your efforts all along the line.

This year it is 4-color advertisements in the *Post*, and similar advertisements in black and white in *Time* and *Newsweek*. The theme is "freedom of choice," including the right of a man to choose the brand of sheet metal he believes will give him the most value.

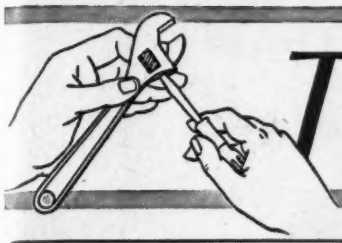
ARMCO's national advertising will continue to support the sheet metal working industry, directly and indirectly. Your interests are ours—and ours yours. The American Rolling Mill Company, 501 Curtis Street, Middletown, Ohio.

EXPORT: THE ARMCO INTERNATIONAL CORPORATION.

FINISH THE FIGHT—WITH WAR BONDS

ARMCO

The American Rolling Mill Co.

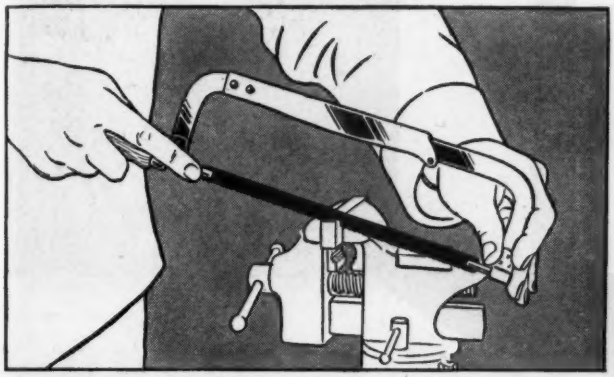


TOOL NOTES

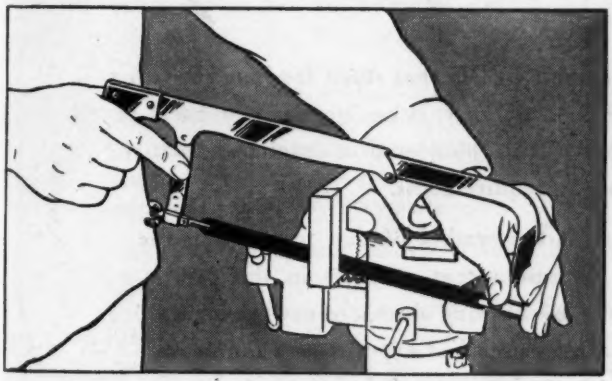
"How To Do It" Information For Crescent Tool Users

No. 18 . . . . PICKING THE PROPER TOOL FOR THE JOB

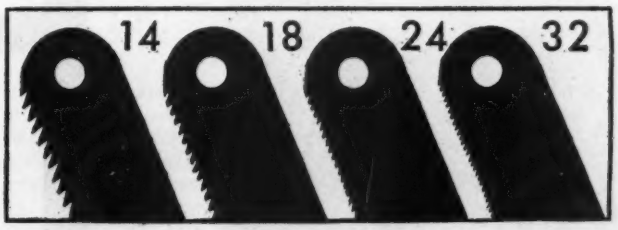
With Hacksaws, the question of picking the proper type concerns the blade more than the frame. However, reasonable judgment should be exercised in choosing a saw for a specific job.



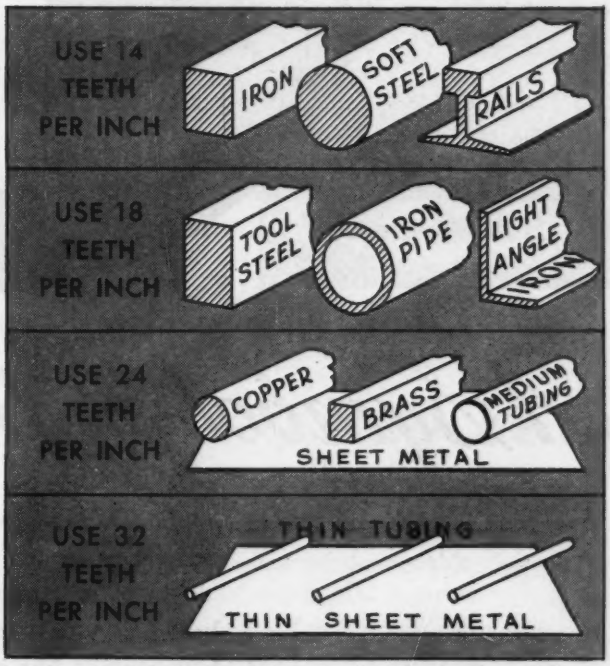
Crescent's No. 1042, for example, is relatively light and is intended for average rather than heavy duty service. Depth of cut is another matter to be considered. The frame above cuts only to a 2-1/2" depth, which might not be sufficient for the job at hand.



Crescent's No. 1047, with its heavy rigid frame, on the other hand is designed for the hardest work imaginable. Its 3-1/4" depth of cut is sufficient for the job illustrated and its big, comfortable, pistol-grip handle enables the operator to put more power in the cutting stroke.



Blades are made with a varying number of teeth per inch, ranging from 14 to 32. Selection of the blade should be based upon material to be cut. Blades with 18 teeth per inch are the best for general use, but there is no such thing as an "all-purpose" blade.



Select your blade according to the above chart. Never permit a condition wherein the teeth "straddle" the work. Use a blade of finer pitch or change the angle between blade and work so at least two teeth are always engaged. Have work securely held when sawing.

MAIL THE COUPON FOR FREE REPRINTS

This is No. 18 in Crescent's TOOL NOTES Series. These informative advertisements provide practical information for users of hand tools. Mail the coupon today!

CRESCENT TOOL COMPANY, JAMESTOWN, N. Y.

CRESCENT TOOLS
Give Wings to Work

Crescent Tool Co., Jamestown, N. Y. I-1

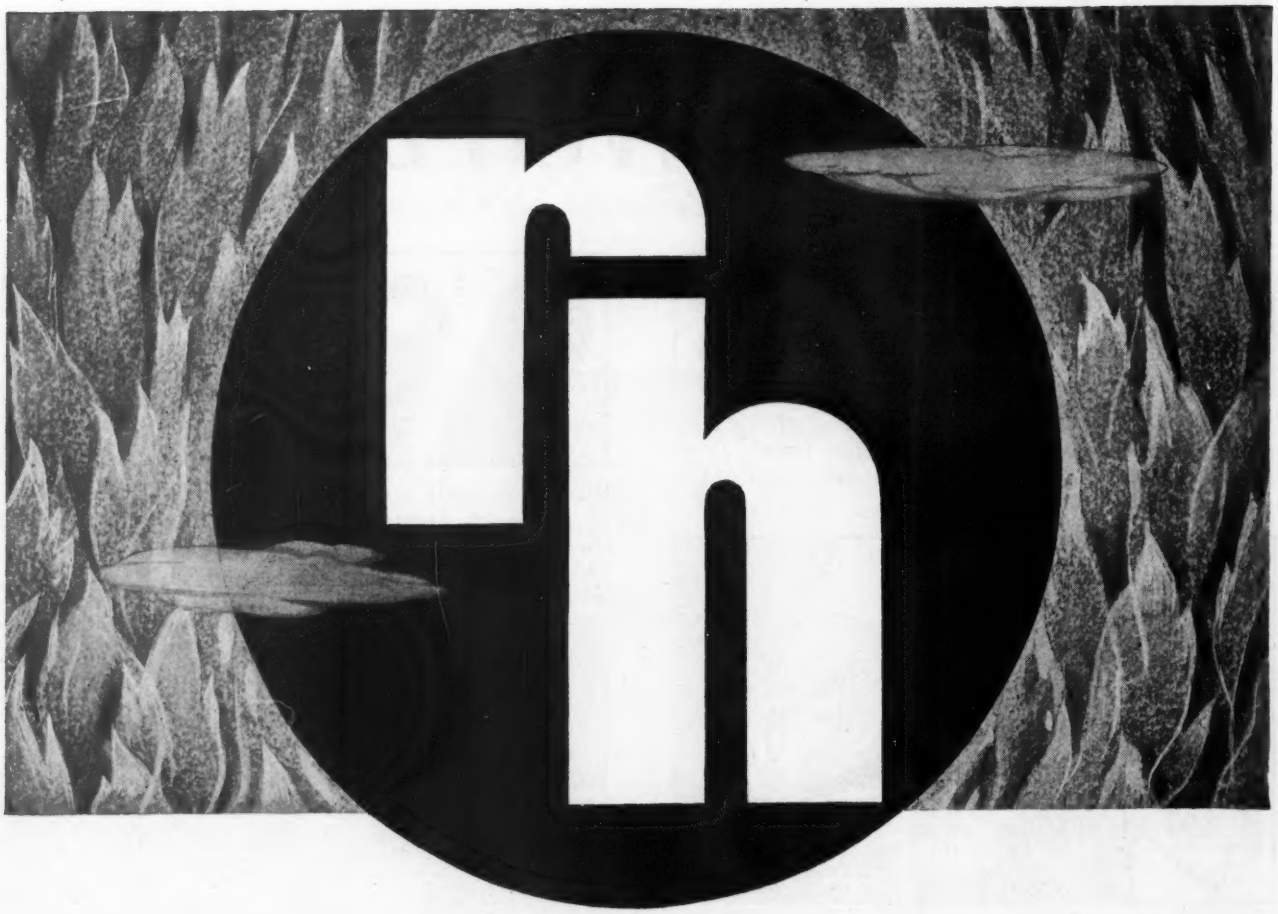
Please send your "TOOL NOTES" Series

☐ for Bulletins ☐ for 3-ring binder

Name _____

Address _____

City _____ *State* _____



A Symbol of Heating Progress

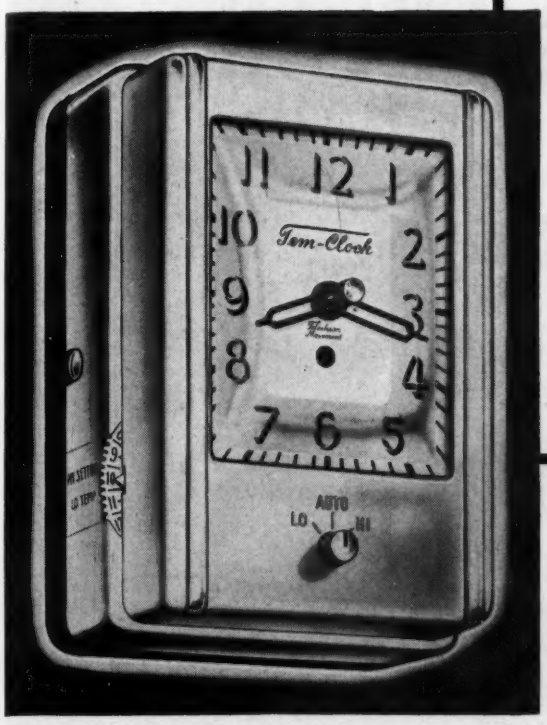
● For thirty years the name RYBOLT has stood for better heating efficiency, economy and dependability. It has stood for progress in the industry because RYBOLT has pioneered in developments that kept pace with ever changing requirements.

The RYBOLT trade mark is the symbol of that progress in the past. It will continue to represent that progress in the future, because RYBOLT engineers are keeping abreast of new trends and are constantly doing practical research and experiment to improve the product. New designs and new features will be adopted as fast as they prove practical and sound. The postwar RYBOLT line will be a better line for you to handle — more profitable for you to sell and more satisfactory for the consumer to buy. The RYBOLT trade mark is our postwar pledge of heating and air conditioning service that will measure up to the highest standard.

BUY MORE WAR BONDS

THE RYBOLT HEATER COMPANY

615 MILLER STREET ★ ASHLAND, OHIO

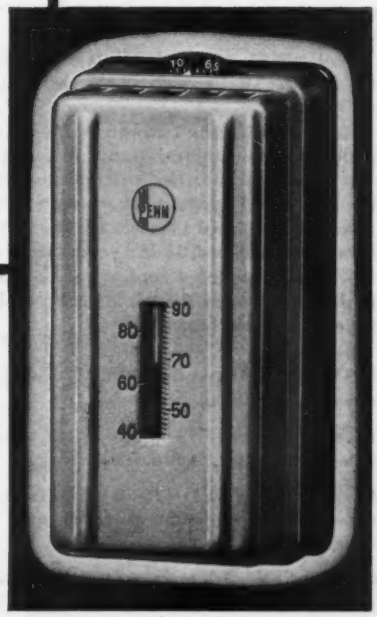


This Tiny Heating Element

can be quickly installed in any Penn heat anticipating thermostat now in service to adapt it to Day-Nite control, in connection with Penn Temclock. Complete Day-Nite thermostats are also available.

Penn Temclock, shown left, which controls the Day-Nite System, can be installed in any room where an electric clock is needed.

Penn Temtrol, shown right, is the famous *heat anticipating* thermostat, which "senses" temperature changes before they occur.



PENN DAY-NITE CONTROL

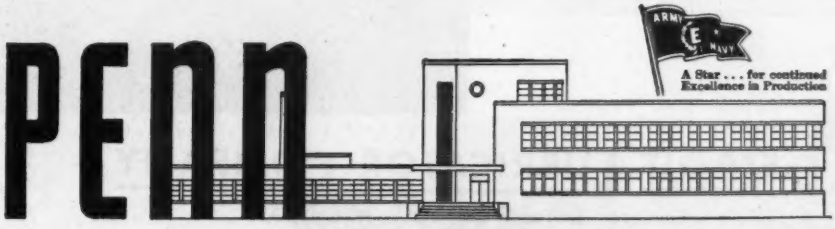
SAVES VITALLY NEEDED FUEL

Automatic night set-back of temperature is an important means of saving fuel. Penn's Day-Nite control system has exclusive advantages of exceptional value now when fuel conservation is so critically necessary.

Any heating system now controlled by Penn Temtrol can quickly and economically be adapted for Day-Nite control. Only the addition of a tiny heating element to the thermostat, and the installation of Temclock, are necessary to effect the change.

Temclock is as easy to set as an alarm clock, and the day and night settings can be changed at will. It can be mounted wherever your customer wants a handsome, dependable timepiece, regardless of thermostat location.

The flexibility of Penn's Day-Nite system and the possibility of economical change-over when a Penn thermostat is now on the job offer dealers a profitable opportunity to perform a patriotic fuel-saving service. At present, Temclocks and thermostats are both immediately available with proper priority rating. Ask your jobber or write direct to *Penn Electric Switch Co., Goshen, Ind.* In Canada: Powerlite Devices, Ltd., Toronto, Ontario.



PENN AUTOMATIC CONTROLS

FOR HEATING, REFRIGERATION, AIR CONDITIONING, ENGINES, PUMPS AND AIR COMPRESSORS

Pure "MOUNTAIN-FRESH" AIR

Clean, efficient Detroit Filters will assure your customers an abundance of pure "mountain-fresh" air in their homes.

And clean, efficient Detroit Filters will save your customers' fuel supply, a necessity in these days of fuel shortages.

Right now is the time to replace Air Filters. With the winter three-quarters gone, filters are loaded with the dirt of several months' operation. But winter isn't over. Furnaces will operate for many weeks to come.

Replace clogged filters with Detroit Filters—and build good-will and profits for yourself.

When filters need replacing, be sure to ask your local jobber for "Detroit" Air Filters, and take advantage of these desirable features.

ECONOMY—Patented cellular design gives more filtering capacity per dollar.

FREE AIR FLOW—Uniform air distribution assures free flow with maximum filtering.

DUST CAPACITY—Thoroughly impregnated with special non-dripping compound to retain dust collecting ability indefinitely.

ODORLESS—Adhesive material is absolutely odorless and will not turn rancid.

LONG LIFE—Entire thickness of filter used in cleaning, thus providing long and efficient filtering.

***STRENGTH**—Selected materials and sturdy construction prevent sagging. No danger of small particles being carried into air stream.

POLLEN—Highly effective in providing relief for persons allergic to air-borne pollen.

CLEANING—Guaranteed factory cleaning and renewal service when necessary—a further economy.

**No critical materials are used in the construction of "Detroit" Air Filters.*

Made in all standard sizes —special sizes to order.

An attractive envelope stuffer is available—imprinted with your name—a powerful stimulant for replacement filter business. If you want some to mail out to your customers, drop us a line on your letterhead.

DETROIT LUBRICATOR COMPANY

General Offices: DETROIT, MICHIGAN

Division of AMERICAN Radiator and "Standard" Sanitary Corporation

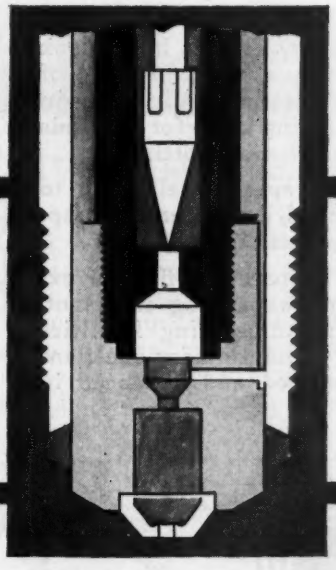
Canadian Representatives—Railway and Engineering Specialties Limited, Montreal, Toronto, Winnipeg

The G-E "plus" for G-E dealers, in tomorrow's heating boom . . .

GENERAL ELECTRIC's years of research, coupled with a wealth of wartime engineering experience, may prove a *decisive* sales advantage for distributors of G-E Automatic Heating equipment in the postwar years.

The fact that the General Electric trade-mark is known and respected throughout industry and in practically every American home is largely due to just one reason — that, over the years, G-E has had the *mind* for research, and the *facilities* for research.

So when Peace returns, the value of this cumulative research, plus the new knowledge born of war, will be reflected in improved General Electric heating and cooling units . . . pace-setters in engineering advancement, in consumer demand, and in dealer sales and profit opportunity. Now is none too soon to plan your own tie-up with this development. *General Electric Company, Heating Division, Section 4532, Bloomfield, New Jersey.*



THE DOUBLE-MIX NOZZLE—an outstanding research development, identified with pre-war G-E heating units, which provides amazingly fine atomization of fuel oil and assures clean, rapid, complete and efficient combustion. Out of *today's* research will come important *new* sales features to distinguish the General Electric heating equipment of tomorrow . . . and to offer new opportunities to its distributors.

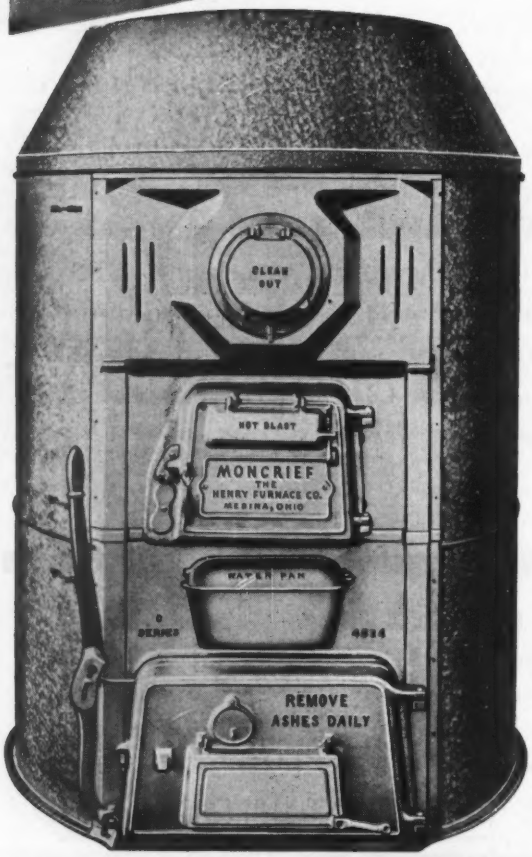
☆ BUY WAR BONDS ☆

GENERAL ELECTRIC

Hear the General Electric Radio Programs: The "G-E ALL-GIRL ORCHESTRA," Sundays, 10 p. m., E W T, NBC..."THE WORLD TODAY" News, Every Weekday 6:45 p. m., E W T, CBS

Moncrief says—

LET'S LOOK AT THE PAST . . . FOR THE FUTURE



MONCRIEF furnaces are backed by the "know-how" of almost 50 years' experience in the manufacture of heating equipment. Their design is proven . . . Their construction is sound.

The MONCRIEF policy for the past half century has been to give the buying public the biggest dollar value possible.

In the belief that history repeats itself, look to MONCRIEF to continue in its position of leadership in Warm Air Heating equipment—in furnaces and air conditioning units for all kinds of fuel, also in warm air pipe and fittings.

In belief that history repeats itself, look to MONCRIEF for advanced design, modern appearance, superior construction.

For MONCRIEF will spare no effort or expense in improving and expanding its plant, plant equipment and manufacturing facilities to the end that its past reputation for excellent products will be maintained and enhanced in the future.

SERIES C Coal Burning Hand Fired Furnace

MONCRIEF
SINCE 1895

WARM AIR FURNACES
FURNACE PIPE and FITTINGS

AIR CONDITIONING SYSTEMS
FOR COAL . . . GAS . . . OIL

THE HENRY FURNACE CO. **MEDINA, OHIO**

DO YOU KNOW ALL *these Fastening "Short Cuts"?*

TO SIMPLIFY WORK ON HEAVY STEEL . . .

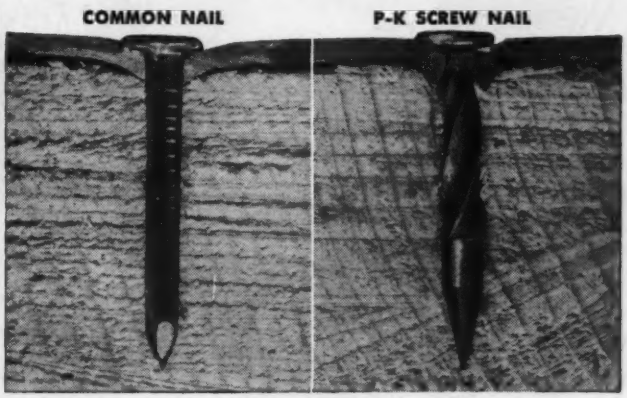
TYPE "Z"

P-K Type "Z" Self-tapping Screws should be kept on hand by more sheet metal workers. This type will do any job for which you might use the well-known Type "A" Sheet Metal Screws. Type "Z" is excellent for fastening heavier metal — sheets up to 6 gauge thickness. For example, the photo shows 16 gauge channeling strips being fastened to 6 gauge ship bulkheads. The job is done so simply that large savings of time are made. Sizes from No. 2 x 1/8" to No. 14 x 2", in various head styles.

FOR EXTRA HEAVY JOBS, USE THIS HEAD

HEX HEAD

Since greater torque can be applied in driving P-K Hex Head Self-tapping Cap Screws, they are widely used to save work in fastening sheets up to 6 gauge, and for steel plates and shapes up to 1/2 in. thick. Also, they are fine for brass, aluminum and die castings, transite board, etc. They are shown here in use for fastening 1/8 in. steel cover plate to the 3/16 in. angle iron frame of a heat-treating oven door. Sizes from No. 6 x 1/4" to 3/8" x 1 1/2".



FOR FASTENING SHEET METAL TO WOOD . . .

SCREW-NAIL

P-K Hardened Screwnails are handy time-savers for tinsmiths, roofers, etc. They won't "work out" like ordinary nails because the spiral threads worm their way into the wood like a screw. The hardened point easily pierces metal that would bend ordinary nails . . . saves punching time. Use them in place of screws to make strong fastenings . . . 3 to 4 times stronger than ordinary nails. Various sizes and head styles.

* * *

TYPE "A"

TYPE "F"

SEVEN different types of P-K Fastening Devices are ready to help you do your work the easiest way . . . do it better, too! Know them all . . . tell us what you want to fasten and we'll send free samples for a trial. Parker-Kalon Corp., 190-192 Varick Street, New York 14, N. Y.

TYPE "U"

MASONRY NAIL

PARKER-KALON *Quality-Controlled* **Self-tapping Screws**

ARE YOU READY FOR YOUR SPRING ROOFING WORK?

The man who is ready to do a piece of work generally gets the order. And being ready to do a roofing job requires an ample supply of materials and equipment.

This Spring will bring a much greater than normal rush for roofing repairs. Be prepared for your share of this work by building up your stocks of Asphalt Shingles, Roll Roofings, Building Papers, Nails, Coatings and Paint.

Although we have a good supply of roofing and roofing equipment in our warehouses now and can make prompt deliveries, we can not, naturally, give any assurance that we will be able to do so two or three months hence. Frankly, we suggest that you don't gamble on future supplies. Order them now from your OSBORN salesman or write us direct.

PRIME METAL SHEETS
EAVES TROUGH, CONDUCTOR PIPE, ETC.
ROOFINGS, NAILS AND PAINTS
FURNACES AND ACCESSORIES
SHEET METAL TOOLS AND MACHINERY

THE J. M. & L. A.
OSBORN Co
CLEVELAND, OHIO
BUFFALO • CINCINNATI • DETROIT
Manufacturers—Distributors of Metals and Metal Products

A DEPENDABLE SOURCE OF SUPPLY FOR 85 YEARS

In the World of Tomorrow...

The future will be better in many ways because of war demands on industry. Here at Weir-Meyer, our engineering, design, and production knowledge dates back to 1866. All the experience of decades has been greatly increased in the past two years of war production. Performance data on installations under every conceivable condition have been gathered.

This intensified experience promises even finer Weir-Meyer equipment in the World of Tomorrow. Stimulating designs, advanced engineering, greatly improved production methods plus the Weir-Meyer reputation for unequalled high quality—no wonder tomorrow's home owners as well as commercial-industrial management will prefer Weir-Meyer.

Higher quality and better performance at lower cost—more goods for more people—will be the creed of industry in postwar America. Distributors and dealers who want to serve their communities profitably are getting facts about Weir-Meyer now. Your inquiry will be welcomed.

★ ★ ★

HEAVY DUTY Equipment

The WEIR-MEYER high-capacity units now going into military, war housing and war plants, will be available for general industrial and commercial applications as soon as war needs are supplied.

☆ ☆

The War Bonds you buy insure America's future. Keep on buying!

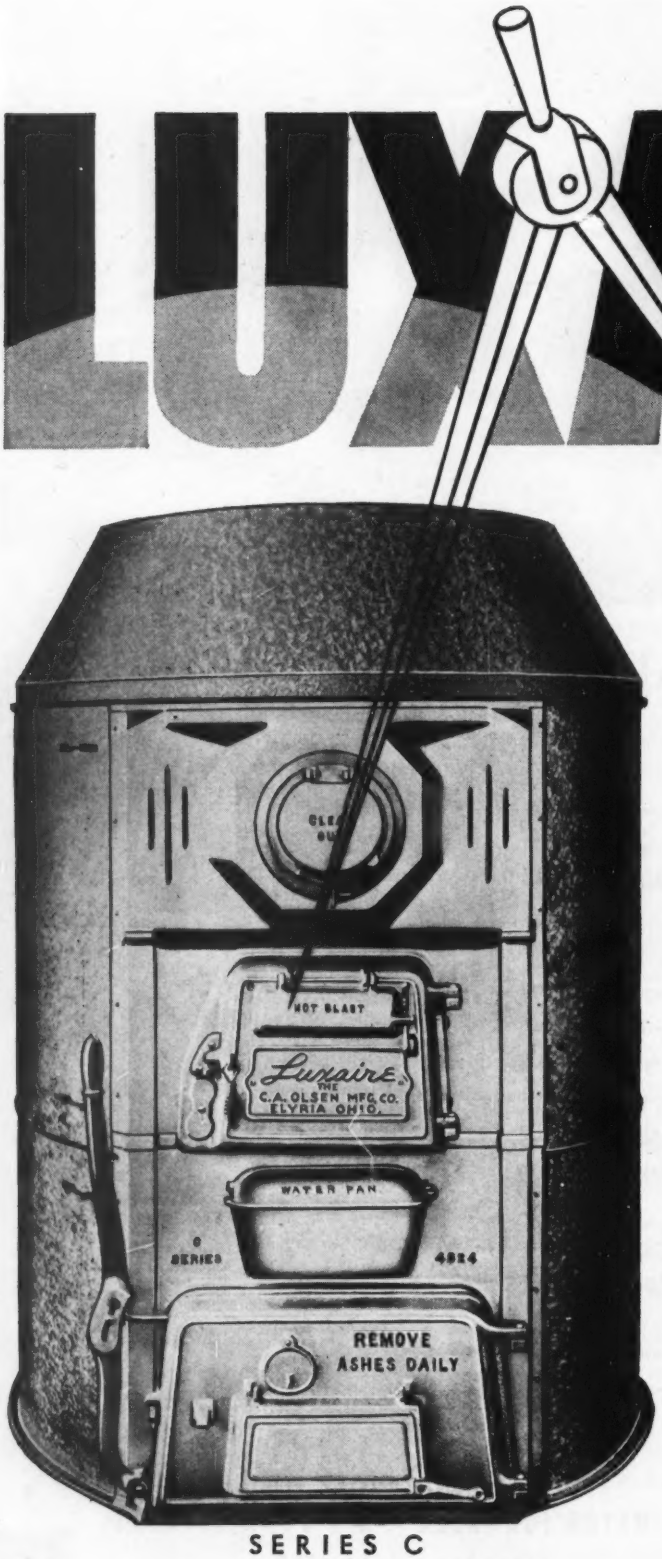
Manufacturers of

WEIR-MEYER FURNACES - - AIR CONDITIONERS for COAL - OIL - GAS

THE MEYER FURNACE COMPANY

COMMERCIAL AND INDUSTRIAL WARM AIR HEATING EQUIPMENT, Peoria 2, Ill., U.S.A.

LUXAIRE



SERIES C

DESIGNED FOR THE JOB * * * * BUILT FOR THE YEARS

BEING prepared to "deliver the goods" will be the position of the C. A. Olsen plant at Elyria, Ohio, manufacturers of LUXAIRE warm air heating and air conditioning units, when the nation's job and our job of producing war materials is complete.

The Luxaire plant is now more than double its original size.

The demands of the armament program have necessitated the addition to the Luxaire manufacturing facilities of much modern, heavier, speedier machinery—machinery that is adapted to the production of furnaces and air conditioning units. As Luxaire met the requirements of war, also it is ready to meet the requirements of peace.

Designed for the Job, Built for the Years, the complete Luxaire line of coal . . . gas . . . oil furnace equipment will be ready, when the time comes, to take its place again as a leader in the warm air heating industry.

BUY MORE WAR BONDS AND STAMPS

Luxaire

WARM AIR FURNACES . . . AIR CONDITIONING UNITS . . . COAL . . . GAS . . . OIL

THE C. A. OLSEN MANUFACTURING CO., ELYRIA, OHIO

"Boys, let's put our heads together and see how much paper and paper board we can save!"

THAT'S the spirit. That's what we've all got to do to lick this problem of getting enough paper and paper board for Army and war-production use.

Every company has got to organize a Paper Conservation Committee and tackle the problem with all the gumption and the brain power at their command.

Paper inventories must be checked with the idea of eliminating peacetime extras. From stationery to board containers, every paper item must be examined to see in what way each company can use less paper.

Functional packaging must be the order of the day.

Sure, you have followed all the government directives on the subject. Even made cuts of your own. But, frankly, that isn't enough. Every time another ship leaves an American port loaded with paper-wrapped war supplies, the problem becomes tougher.

And it's up to you to join with the rest of industry to lick it. The War Advertising Council and the War Production Board have prepared a brief list of suggestions to help you. But you know your own business. You know how you can use less paper. ***It's up to YOU!***

TO GET MORE PAPER FOR . . .	USE LESS PAPER THESE WAYS
Blueprints for battleships	Eliminate slack fills.
"K" ration containers	Increase units per case to the maximum practical.
Signal Corps radio sets	Reduce separators to shoulder height.
Containers for shells	Eliminate carton liners if possible.
Gas mask canisters	Eliminate individual cartons wherever possible.
Disposable gun covers	Reduce weight of containers whenever compatible with safety.
V-mail envelopes	Do away with all unnecessary overlapping.
Blood plasma boxes	Set up a Paper Conservation Board in your plant.

This advertisement prepared under the auspices of the War Advertising Council in co-operation with the Office of War Information and the War Production Board.

Let's All Use Less Paper

Space for this advertisement contributed by AMERICAN ARTISAN.

ANNOUNCING
Weirzinc
ELECTROLYTIC ZINC COATED SHEETS AN TR
WIDTHS
32 1/2" TO 3/8"
WEIRTON

AN TRIP
ADAPTABLE
TO A WIDE VARIETY
OF USES
AVAILABLE
IN COILS
OR CUT LENGTHS
WRITE FOR YOUR SAMPLE
OF WEIRZIN AND ANY ADDITIONAL
INFORMATION YOU MAY REQUIRE
It's here—32½" wide electrolytic zinc coated sheets—available in coils—or cut lengths—down to ¾" strip.
Weirton's exclusive new precision mill has revolutionized the manufacture and use of zinc coated sheet. Turning it out automatically in a continuous strip up to 32½ inches—in a new standard of uniformity—it is adaptable to a wide variety of uses where the protection of a zinc coated material is required.
WEIRZIN is produced in .008 and heavier gauges coated 1/10 or 2/10 ounces per sq. ft. both sides. It is available in Bonderized Sheets up to 36" lengths.
Here at last, modern production methods give you the ultimate in electrolytic zinc coated sheets—a high quality ductile steel with a perfectly bonded coating suitable for deep drawing. An amazingly uniform product that provides unusual and material advantages in fabrication as well as the possibility of important savings in cost.
WEIRTON
STEEL
COMPANY
STEEL CO.
WEIRTON, WEST VIRGINIA. Sales Offices
Division of NATIONAL STEEL CORPORATION
Executive Offices, Pittsburgh, Pa.
NATIONAL STEEL CORPORATION

. . . YOUR 4TH WAR LOAN QUOTA

WHETHER your plant meets its quota, or fails, lies largely in *your* hands. Your leadership can put it over—but if you haven't already got a smooth running, hard hitting War Loan Organization at work in your plant, there's not a minute to lose.

Take over the active direction of this drive to meet —*and break*—your plant's quota. And see to it that every one of your associates, from plant superintendent to foreman, goes all-out for Victory!

To meet your plant's quota means that you'll have to hold your present Pay-Roll Deduction Plan payments at their all-time high—plus such additional amounts as your local War Finance Committee has assigned to you. In most cases this will mean the sale of *at least* one $100 bond per worker. It means having a fast-cracking sales organization, geared to reach personally and effectively every individual in your plant. And it means hammering right along until you've reached a 100% record in those *extra* $100 —or better—bonds!

And while you're at it, now's a good time to check those special cases—*growing more numerous every day*—where increased *family* incomes make possible, *and imperative,* far greater than usual investment through your plant's Pay-Roll Deduction Plan. Indeed, so common are the cases of two, three, or even more, wage-earners in a single family, that you'll do well to forget having ever heard of '10%' as a reasonable investment. Why, for thousands of these 'multiple-income' families 10% or 15% represents but a paltry fraction of an investment which should be running at 25%, 50%, or more!

After the way you've gone at your wartime *production* quotas—and topped them every time—you're certainly not going to let anything stand in the way of your plant's breaking its quota for the 4th War Loan! Particularly since all you are being asked to do is to sell your own people the finest investment in the world—*their own share in Victory!*

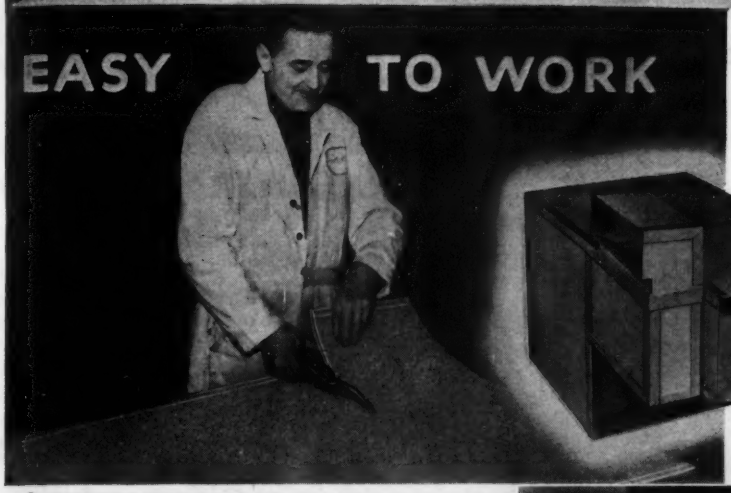
LET'S ALL BACK THE ATTACK!

This space contributed to Victory by

AMERICAN ARTISAN

This is an official U. S. Treasury advertisement—prepared under auspices of Treasury Department and War Advertising Council.

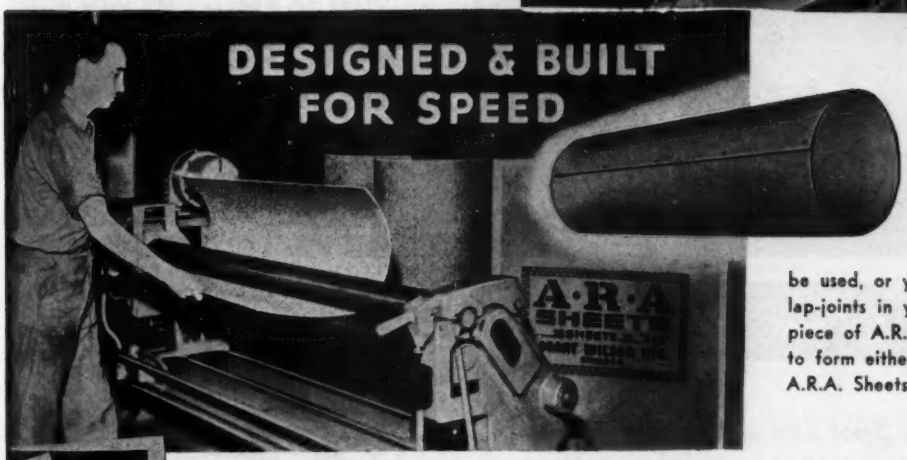
Cutting-Scoring-Rolling A·R·A SHEETS



A.R.A. SHEETS are the accepted alternate for sheet steel in the Heating and Ventilating Field. These preferred and workable sheets are designed and constructed to lend themselves to easy fabrication. You can cut these strong sheets easily to any pattern with a pair of snips, giving a clean, smooth, precise and definite edge.

A.R.A. SHEETS can be quickly notched, die-cut and fabricated into intricate and complicated fittings in your own shop. "Sheetlock" or other preformed metal corners and fastening seams can be used to make up very strong and durable A.R.A. fittings. A.R.A. Sheets are the most WORKABLE sheets on the market today.

Here is a simply way to Score A.R.A. Sheets in your brake to any desired angle. Mark the A.R.A. Sheet where you want to score. Set your brake to allow for the thickness of the sheet plus 1/4" or 3/8" for a metal rod which should be a little longer than the sheet. When the sheet is in the brake, place the rod exactly on the line to be scored, and then pull the top leaf bar of the brake several times. The rod creases and flattens the A.R.A. Sheet, forming the perfect score on which the sheet can be bent to any desired angle. With a little practice you will get most satisfactory results.



You can roll up A.R.A. Sheets satisfactorily and quickly on your own rollers into strong smooth round pipe. All you have to do is feed the sheets thru the same as you would a sheet of steel.

You can roll the back of fittings to make bends or you can roll round pipe. Standard metal (sheetlock No. 2 seams) can be used, or you can rivet, screw or staple longitudinal lap-joints in your shop or on the job. You can roll a piece of A.R.A. Sheet or a narrow strip of scrap metal to form either sleeve or collar for the butt joints. Try A.R.A. Sheets and be convinced.

Write today for the free 16-page illustrated booklet No. 89-A, which describes the many outstanding features that are possible only in A.R.A. Sheets.

Get genuine A.R.A. Sheets from your jobber

Asbestos clad A.R.A. Sheets are tough yet flexible—rigid but not brittle—fire-proofed and water-proofed—will not dry out, crack, crumble, or chip, have a high insulating value (K. 45' B.T.U.) and good sound-deadening properties.

Here is the package of A.R.A. Sheets that make it the most convenient sheet to ship, stock or carry on the job. The Sheets are always clean and in good condition.

CARTON CONTENTS

20 Sheets 33" x 48" Per Carton
40 Sheets 16½" x 48" Per Carton

SHIPPING WEIGHT
Approximately
100 lbs. per Carton

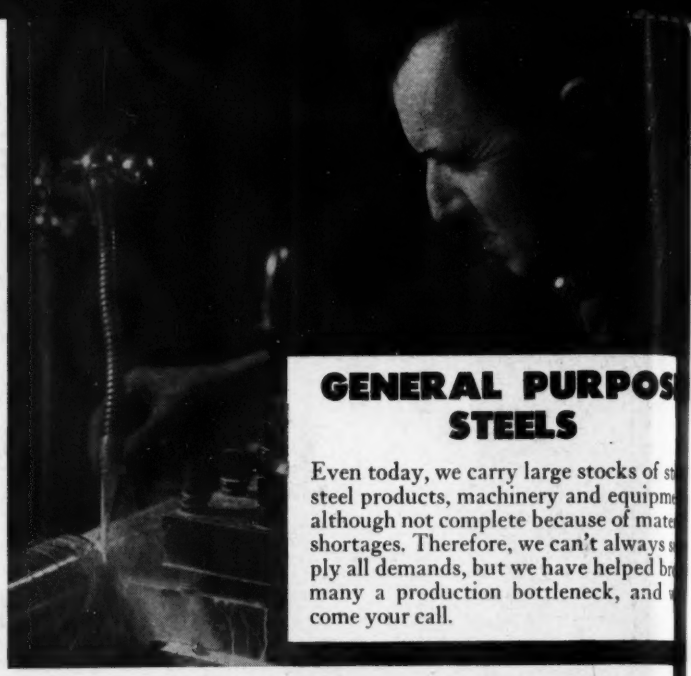
SHEET THICKNESSES
Approximately
3/16" thick

ZONE NUMBER 24

4101 WEST TAYLOR ST. GRANT WILSON, INC. CHICAGO ILLINOIS

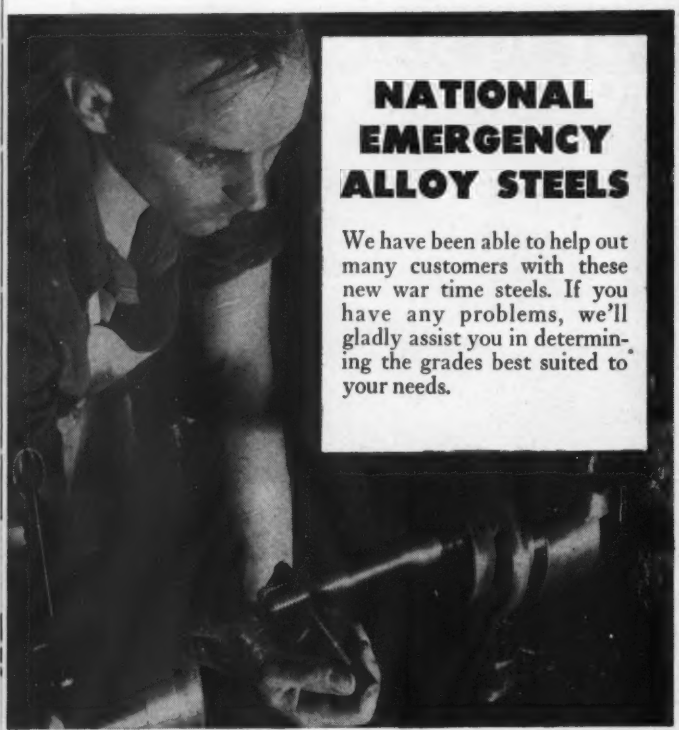
LOOKING FOR STEEL?

A call to us may solve your problem. Our job is to keep war production moving, so if you need steel, we'll get it to you in a hurry, if at all possible—subject, of course, to priority regulations. We will appreciate receiving your inquiries—phone, write or wire our nearest warehouse. You'll get prompt, courteous attention.



GENERAL PURPOS STEELS

Even today, we carry large stocks of st steel products, machinery and equipm although not complete because of mate shortages. Therefore, we can't always s ply all demands, but we have helped br many a production bottleneck, and come your call.



NATIONAL EMERGENCY ALLOY STEELS

We have been able to help out many customers with these new war time steels. If you have any problems, we'll gladly assist you in determining the grades best suited to your needs.

AIRCRAFT STEELS

These steels are for use in airplanes and available at Chicago Warehouse only—which has been designated the WPB as a warehouse to distribute them:

WD-X-4130 SHEETS
Open Hearth, Pickled and Oiled to Spec. AN-QQ-S-685. All gauges .016 to .50, sheets 18 x 72".

NE-8630 SHEETS
Open Hearth, Pick and Oiled to Spec. A S-12. All gauges .01 .50, sheets 18 x 72".

STAINLESS STEEL BARS
Spec. AN-QQ-S-771.

STAINLESS SHEETS
Spec. AN-QQ-S-77
Spec. AN-QQ-S-75

Write, phone or wire, if you are eligible for these st

WELDING ELECTRODES—ALL TYPES

Send for our new Stock List and Reference Book—it's FREE

Send for FREE copy of our new Stock List and Reference Book

UNITED STATES STEEL SUPPLY COMPANY

CHICAGO (90),	1319 Wabansia Ave., P. O. Box MM	Teletype CG. 605	BRUnswick 2000
BALTIMORE (3),	Bush & Wicomico Sts., P. O. Box 2036	Teletype BA. 183	GILmore 3100
BOSTON (34),	176 Lincoln St., Allston, P. O. Box 42	Teletype BRTN. 10	STAdium 9400
CLEVELAND (14),	1394 E. 39th St.,	Teletype CV. 153	HEnderson 5750
MILWAUKEE (1),	4027 West Scott St., P. O. Box 2045	Teletype MI. 587	Mitchell 7500
NEWARK (1), N.J.,	Foot of Bessemer St., P. O. Box 479	Teletype NK. 74	Bigelow 3-5920
			REctor 2-6560 · BErgen 3-1614
PITTSBURGH (12),	1281 Roedsdale St., N. S.	Teletype PG. 475	CEdar 7780
ST. LOUIS (3),	21st & Gratiot Sts.,	Teletype SL. 384	MAin 5235
TWIN CITY,	2545 University Ave., St. Paul (4), Minn.	Teletype STP. 154	NEstor 2821

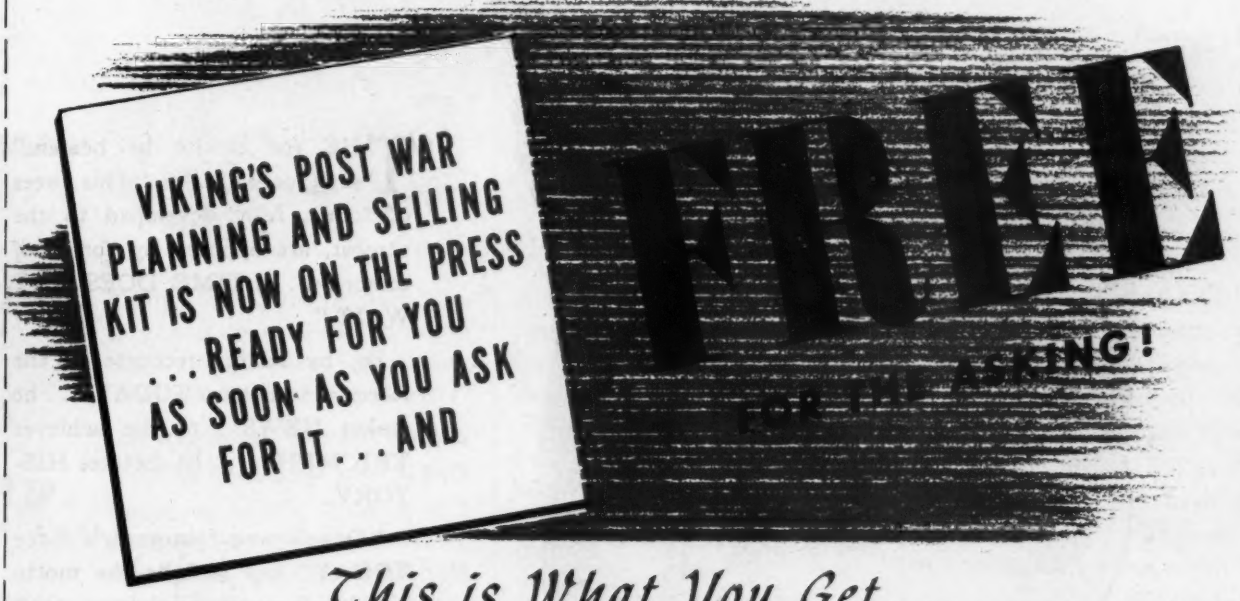
UNITED STATES STEEL SUPPLY COMPANY
USS STEELS
SERVICE

UNITED STATES STEEL

VIKING'S POST WAR PLANNING FILE FOR DEALERS

At Last...

Real and Valuable Help for You NOW for Your POST WAR PLANNING



This is What You Get...

CHECK CHART OF THINGS TO DO NOW

Do you know the 18 things you can do now... today to help get post war business? They all cost little in time, in effort, in money, yet each one will take you one step further on the road to getting your share of the tremendous after-the-war demand for heating improvements. With this chart you can check yourself to see what can be done, what you are leaving undone. *Free for the asking!*

TIPS ON WHAT TO DO AND HOW

The points in the check list are developed more fully in reprinted magazine advertisements and in special articles. These tips will tell you specifically what you can do now and how to do it. The result... you will be lining up prospects against the time when merchandise is available, and making your first contacts sooner than competitors do. *Free for the asking!*

LITERATURE FOR YOU TO USE NOW

How would you like to know before competitors do what post war models will be like? You can get acquainted with the new models, learn their selling points and learn how to sell them even before they are available. Some of our new product literature is being prepared even now. You can familiarize yourself with its new sales features and be ready for business when Victory comes. *Free for the asking!*

SELLING HELPS TO BE USED NOW

Now being prepared... selling helps designed to presell your prospects today. These will have the form of consumer literature, practical help in planning improvements, letters, educational matter. These materials are designed to be used today, and they take into account the absence of merchandise. Their job is to develop leads for you. *Free for the asking!*

IT'S FREE Now is the time for action. The first data sheets in the Viking Post War Planning and Selling File are ready for you. Dealers shown the first data sheets have immediately asked to be added to the list so as to get all the others. This file is a useful, practical guide for dealers who care about their future. Of course it isn't perfect. But we've tried to make it genuinely helpful. Why not send for it now and see for yourself? It may help you too.

Viking

IN PEACETIME, PRODUCERS OF:

AIR CONDITIONING CORPORATION • *5600 Walworth Avenue • Cleveland 2, Ohio*

— then he said to himself

"TIME DOES NOT WAIT"

"THE foe cannot be beaten," says Joseph Stalin, "if his forces of today, fully developed to the utmost, are opposed by forces of tomorrow . . . TIME DOES NOT WAIT."

So, by having recourse to the forces of tomorrow TODAY . . . he makes NEWS . . . he achieves TRIUMPHS . . . he dictates HISTORY.

"Developing tomorrow's force TODAY" can well be the motto hanging in every conference room where factory committees are discussing postwar procedures.

And under that motto these words: "Our ship, tank, plane, weapon industries are TODAY working with tomorrow's greatest forces for production. Come re-conversion to peacetime products, they are in practiced strategy to outproduce and underprice all competitors who have the temerity to go into postwar production with day-before-yesterday's techniques."

"Even if you had the time—don't wait for time."

"TIME DOES NOT WAIT"... *he says*

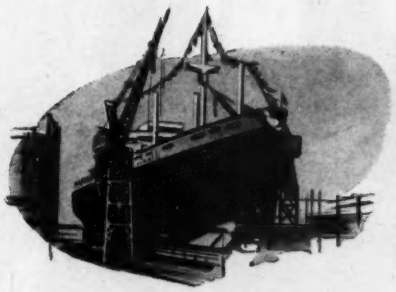
Look, Mr. Stalin, how through *recourse to Arc Welding* you can tweak time's forelock.

Similar time savings gave you tomorrow's force today.

Arc Welding, of course, will not win the war for you . . . but lack of Arc Welding could have lost it for you.

And that thought might well be another motto for each postwar planning room.

DAYS instead of MONTHS



Easily the margin between Victory and defeat—for you and the United Nations—is putting ships on the water *6 times faster*.

LAST WAR "Liberty" size ship 300 DAYS
THIS WAR they average under 50 DAYS

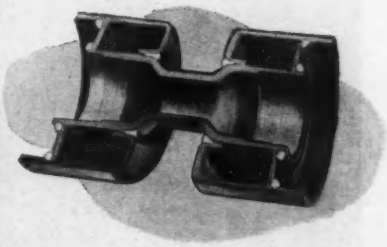
Recourse to Arc Welding in 2 years has put to work 2000 more ships than possible under old standards—thus saving the necks that Old Methods would have lost—yours and ours.

Think *that* one over!

HOURS instead of WEEKS

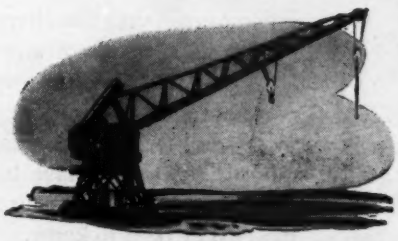
A sit-down in a steel plant lasting for weeks would be a headline SCREAM in Pravda and every newspaper in the world. That catastrophe was averted by *recourse* to Arc Welding when these six welders repaired the break of a vital steel mill part in 8 hours. Replacement would have taken weeks . . . thus sabotaging the output of a hundred war producers. Think that one over too—in terms of providing *recourse* to help in trouble.

MINUTES instead of HOURS



Half-track parts at half-time speed . . . these are typical of machine parts which *recourse* to Arc Welding helped rush to first and second fronts. Processing cost cut from $11.00 to $6.64. Machining cost cut from $3.50 to $1.25. Weight cut from 27½ to 24 lbs. Time cut 45%. This cutaway picture is to help you think over what *recourse* to Arc Welding will do to the cost of any part of any of your machines.

MINUTE-MEN of production cut MAN-HOURS on every job



This 28-ton revolving crane which literally gives the *lift* to America's ultra-speedy shipbuilding industry—gets to the job 1,584 MAN-HOURS SOONER through *recourse* to Arc Welding.

FABRICATED . . . 23.5% FASTER
ERECTED . . . . . 21% QUICKER
than by riveted construction.

THE LINCOLN ELECTRIC COMPANY • Cleveland 1, Ohio

America's greatest natural **recourse**

ARC WELDING

Class in Electricity

Drawn from widely separated peacetime occupations, these purposeful learners in a Bethlehem shipyard are being taught the essentials of marine electrical work.

None of them had ever before set foot in a shipyard, or had any experience with electricity beyond changing a light bulb or plugging in a toaster. But soon these same men and women will be installing complicated electrical wiring on troopships and cargo carriers—and doing the work with speed and skill comparable to an experienced electrician.

Not that full-fledged electricians can be produced in a few short weeks. But by well-planned training, learners who are responsive and alert can quickly be trained to do some one branch of the work, and do it with speed and proficiency.

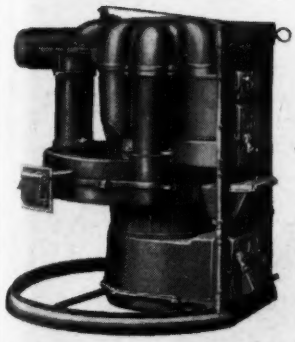
Training unskilled workers in marine electricity has been done successfully by following the same principle as in training workers for hundreds of other jobs: Take complicated operations or crafts that normally call for perfected skills, and break them up into their simple, readily-learned component parts.

Since 1939 Bethlehem employment rolls have increased from 100,000 workers to nearly 300,000, while 65,000 employees have left to join the armed forces. Four out of five of our present employees are virtually newcomers, many of them women.

With instructors and supervisory people selected from among older employees to teach and guide them, these new workers have been given intensive, streamlined courses in the things they need to know.

Their zeal, their eager responsiveness to training, their ready adaptability to new tasks and surroundings, have paved the way for the all-time records Bethlehem is establishing in steel-making and ship construction.

★ ★ BETHLEHEM STEEL ★ ★



Since 1915 Performance Has Sold RUDY Furnaces For You

New Design, New Performance Will Continue To Sell

Rudy

FURNACES

For nearly thirty years extra capacity and improved design have helped Rudy dealers to greater profits, better installations, more friendly customers.

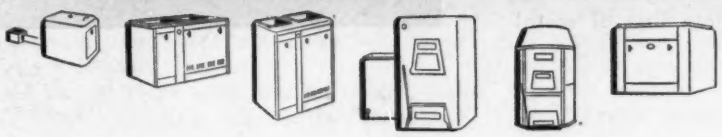
Today, Rudy quality is being engineered into a new line of furnaces with improvements and features to appeal to your postwar customers and bring you still greater sales.

You'll be invited to preview these new furnaces later. Meanwhile, Rudy's present line is available for essential wartime needs.

Write Today for this twice-monthly bulletin. Contains new slants on postwar selling, planning, engineering, written by men experienced in meeting the problems you face now. Facts of real value to all heating dealers and distributors.

RUDY
DOWAGIAC
MICHIGAN

RUDY FURNACE COMPANY · DOWAGIAC, MICH.



EVEN FINER RUDY PRODUCTS TOMORROW

Sheet Steel In Stock

Your nearby Ryerson plant carries over seventeen different kinds of prime sheets in stock for immediate shipment. These sheets represent a complete range of types and sizes – hot rolled, cold finished, galvanized, Allegheny stainless and many others. You may order your sheets sheared to size or otherwise prepared to meet your requirements. Our expert operators and modern equipment assure quick delivery to your exact specifications.

Call Ryerson when you need sheets – or other steel products. For the convenience of sheet metal shops we also carry a complete line of metal working machinery. Write for steel stock list or machinery catalog.

Joseph T. Ryerson & Son, Inc., Steel-Service plants at: Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City.

RYERSON

More Materials in 1944?

DURING the fourth quarter of last year this industry was encouraged over the outlook for more furnaces, more sheets, perhaps more accessories, perhaps some materials which have been denied and it seemed, last quarter, that 1944 would definitely see us out of the worst of the scarcities.

But when all the smoke cleared away last month and manufacturers actually received their materials quotas it developed that we will not have all these things we hoped for, in the quantities we expected to get.

What has happened seemingly is this—Office of Civilian Requirements set up, in 1943, a tentative list of the many items badly needed by civilians and convinced top officials in WPB that materials for these items—in the quantities visualized by OCR—should be provided, if civilian morale was to be encouraged. OCR—just like our industry and other industries—was encouraged.

But just about the time these materials were in the actual process of being dished out, Army and Navy stepped in and in substance said—"We can't release these materials to civilians. We still have a long, hard fight to victory. If civilians get the idea materials are not needed for war they will think the war is in the bag and production will suffer. Wait until the invasion is well in hand. Wait until the casualty lists have had a chance to convince civilians the war is a long way from won. Then, if we still have surplus materials, turn these materials over to civilian items."

And Army and Navy won the argument.

So, until the war is actually "in the bag," civilian needs are going to remain at the bare necessity level.

For our industry this means that furnaces for new war housing will probably be called for in just about the same numbers as in 1943. Furnaces for replacement will likely not exceed the 200,000 forecast by AMERICAN ARTISAN last October. Accessory items like fans and blowers, humidifiers, oil burners, stokers, controls will each have to prove its necessity before materials will be released. Dealers will do well to plan their 1944 sales on the basis of the last half of 1943. For example, dealers probably will not get any more replacement furnaces than shown in ARTISAN'S county tabulations in the November, December, January and February issues.

If the crises should come soon and be passed successfully, then more materials will be forthcoming—meanwhile continue to make every sale a necessary sale and repair and maintain as in 1943.

If proof of this suggestion is needed, consider what happened to controls for commercial heating systems. OCR got approval for 20,000 sets of controls to be made in the fourth quarter of 1943. But materials were received only 45 days before the end of the fourth quarter so, obviously, the 20,000 sets could not be produced. Then it developed that no materials had been allocated for the first quarter of 1944 so we won't have the 20,000 sets we read about and we may not get any more sets than were turned out in 45 days. Much the same thing can happen—is happening—to other equipment we need.

There are two conclusions to be drawn from these facts.

(1) The war agencies are still in control of materials. Until Army, Navy, etc., feel certain that the war is won they will be very hesitant to release materials and very cautious in giving the public any encouragement over the end of the war. Until this situation is positively ended our industry will do well to stick pretty close to the business volume we had in the last half of 1943.

(2) Our industry and many other industries can sell itself up to the hilt on how essential its products are to the health, comfort, happiness of civilians and our industry can convince OCR of our essentiality (for, after all, OCR is assigned the job of keeping civilians healthy) but we won't get the materials we ask for until the war agencies also believe as we do. We should continue, then, as we have been doing for the last two years, to spread what we have as widely as possible.

This much is encouraging—WPB has determined that once the war is won, reconversion to civilian production can be a great deal more rapid than originally believed. Especially is this true of small manufacturers and of industries whose products come from small producers or manufacturers who are making pretty much their peacetime line for war uses. Our heating industry is definitely in this category.

Therefore, conversion will probably be speedy, once the war is won, and within a few months the heating industry may be all set to produce and install more furnaces and accessories than in our biggest pre-war year.

There is every incentive to plan on this basis.

TAX CALENDAR

Contractors should prepare a Tax Calendar similar to this covering Federal, state and local laws, which reminds of dates on which reports and returns must be filed. File in advance of due dates if possible. Also may include property taxes.

Jan. 1— Employee status determination date. (Form W-4)**

Jan. 10— Deposit December withholdings in depository if more than $100.*

Jan. 20—File sales and compensating use tax return to city.

Jan. 31— Furnish each employee a record of income taxes collected and wages paid during preceding year. (Form W-2)
Make quarterly return for last quarter in preceding year. (Form W-1)
Reconcile on Form W-3 the totals of withholdings on Form W-2 with totals on quarterly returns for preceding year (Form W-1).
Make quarterly return under Federal Insurance Contributions Act on Form SS 1-a.
Make quarterly return to state for unemployment compensation.
Make annual return for preceding year on Form 940 under Federal Unemployment Tax Act.

Feb. 10—Deposit January withholdings in depository if more than $100.

Mar. 10— Deposit February withholdings in depository if more than $100.

Mar. 15— File Federal income tax return covering preceding year.
File declaration of estimated tax for current year.
Pay first installment on unforgiven part of 1942 tax. (Final installment due March 15, 1945.)

Apr. 10—Deposit March withholdings in depository if more than $100.

Apr. 20— File sales and compensating use tax return to city.

Apr. 30— Make quarterly return for first quarter. (Form W-1)
Make quarterly return on Form SS 1-a.
Make quarterly return to state for unemployment compensation.
File state income tax return.

May 10— Deposit April withholdings in depository if more than $100.

June 10— Deposit May withholdings in depository if more than $100.

June 15— File General Business tax return to city.

June 15— Make quarterly payment of estimated tax for current year.
File an amended declaration if advisable.

July 1— Employee status determination date. (Form W-4)

July 10—Deposit June withholdings in depository if more than $100.

July 20— File sales and compensating use tax return to city.

July 31— Make quarterly return for second quarter. (Form W-1)
Make quarterly return on Form SS 1-a.
Make quarterly return to state for unemployment compensation.

Aug. 10— Deposit July withholdings in depository if more than $100.

Sept. 10— Deposit August withholdings in depository if more than $100.

Sept. 15— Quarterly payment of estimated tax for current year.
File an amended declaration if advisable.

Oct. 10— Deposit September withholdings in depository if more than $100.

Oct. 20— File sales and compensating use tax return to city.

Oct. 31— Make quarterly return for third quarter. (Form W-1)
Make quarterly return on Form SS 1-a.
Make quarterly return to state for unemployment compensation.

Nov. 10— Deposit October withholdings in depository if more than $100.

Dec. 10— Deposit November withholdings in depository if more than $100.

Dec. 15— Final payment of 1944 estimated tax due by individuals who have previously made declarations.
File an amended declaration if advisable.

***On January 1 and July 1, check the exemption status of each employee to determine if it has changed, thereby affecting the deduction.*

**Withholdings for last month in quarter may be sent direct to Collector of Internal Revenue with the two depository receipts for the first two months in quarter if desired.*

Change listings to comply with new laws.

Report, Record — Or be Penalized [Part 2]

By Arthur Roberts

4—Stock Control

TO SHOW compliance with WPB and other regulations covering inventory, excessive stock, scrap, etc., to minimize loss, waste, theft, stock control is needed.

The Purchase Journal is the book of original entry for credit purchases. The old way was to record the date, supplier and amount for each item, but to provide the information needed to meet present-day regulations, additional columns should cover controlled materials, certifications, preference ratings, etc. All purchases passing through this book may not cover controlled materials. Some purchases may be for stationery, re-tread tires, etc., hence, the need for additional explanatory columns.

Form F shows suggested headings for the Purchase Journal. Adjust to suit requirements.

Under "WP", note if the materials are purchased for a war production sub-contract. Under "WPB data", place information as to customer's rating or other requisites incidental to the purchase under regu-

FORM F

Purchase Journal

Date	Purchase	Supplier	Amount	WP	WPB data	Amended	Customer

lations. If none is required, leave blank. The purpose of this column is to show that you have complied with regulations, then file the papers alphabetically in a special file or section of your regulation file exclusively assigned to WPB transactions. Note amendments under "Amended" with date. A copy of the amendment should be in your WPB file. Changes in regulations should increase instead of diminish from now on.

By keeping all data touching your business on WPB, OPA and tax in separate files and systematic, you will save yourself a lot of headaches. Contractors should have all WPB regulations from P-84 to CMP 5 on file with amendments. Don't keep this data in your desk drawer, in file, in the safe, all over the lot, as too many contractors do. File it systematically. Get yourself a good file, folders, alphabetical index, card index cabinet, time stamp and other essentials to systematic routine. Today, and in the postwar period, you'll need them.

Stock Control System

A simple stock control system is another "must" to determine quickly whether you have excessive inventory, what you did with scrap, your preference rating, when you requested an allotment on Form CMP-4B, approval date, what you did with the materials on repair jobs and why you need a supplementary allotment in a given quarter. You may have to show figures backed by records to have your applications approved. A stock control system is necessary to furnish this data.

We haven't the space to detail the operation of a stock control system but we do emphasize that you need one today to meet WPB regulations, to keep track of materials used on war production sub-contracts, to minimize waste, errors and theft. At present, with inventories slim, many contractors can quickly determine excessive stock and other information, but when the postwar boom arrives, inventories will expand tremendously to take care of the many heating instal-

FORM G

Stock Control Card

For Materials and Supplies

Item ____ Supplier ____ Description ____

Size ____ How Packed ____ Grade ____ Min. ____ Max. ____

MONTHLY RECORD OF DISBURSEMENTS WP.

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1944													
1945													
1946													

MONTHLY RECORD OF STOCK ON HAND AND PURCHASES Total

Stock														1944
Rec'd														
Stock														1945
Rec'd														
Stock														1946
Rec'd														

This gives an idea of the information required on a stock control form, which may be placed on a card or looseleaf sheet. This type form can also be used for sales in the postwar period.
Use the back of this form to note regulatory information touching the item on the form.
WP stands for war production. Check if the item is used on a war production sub-contract.

lations needed, then a stock control system will be needed to see that all materials going to jobs are accounted for, that losses are kept at minimum.

When revising your Purchase Journal or installing a stock control system, do not try to reflect every change in regulations. Keep your system simple and flexible so that you can take the changes in their stride. The headings suggested for the Purchase Journal give an idea along these lines. A few notations under the proper columns and adequate filing routine will suffice to cover requirements, and government auditors or your own staff can check transactions easily.

4—Incoming Cash Control

Cash book entries need little revision. If you pay a sales tax, carry a special column for this levy on cash sales of smoke pipe and other "over-the-counter" items. Payments on charge sales, installment sales, war contracts, etc., may be noted in the usual way and posted to their respective accounts in the ledger.

5—Departmental Control

For the duration, many contractors will major in repairs and maintenance with little departmentalizing to do, but in the postwar period, it will be necessary to trace profit and loss to source, to show how much they earn on oil burner, air conditioning, coal stoker and straight furnace installations; accessories, over-the-counter sales, and repairs. This means that the Sales Journal (Form A) must carry columns for these departments and separate accounts for labor and materials, overhead to be pro-rated to each department to arrive at the departmental net. For the duration, contractors who have war production work must keep these records separate. Even sub-contractors may be renegotiated so you should know just how much profit you earn on war work.

In this article, we have given an idea how to do this. John Black was on war production. His time slip carried this notation, likewise, his payroll register. Form F (The Purchase Journal) has a separate column "WP" so that materials and supplies on war production jobs can be charged to a separate account. The stock control card carries a "WP" notation. Requisition slips on "WP" jobs should be duly earmarked.

Form W should be prepared for the war production department. In short, all war work figures should be separated from the other departments from the time slip to the profit and loss statement so that you know exactly what you earn on this work.

You can't tell where you stand on a war production job or any big job from month to month because of the completed work and work in progress not billed. There will always be a difference between prime cost accrued, or labor and materials, and the amount billed, but this discrepancy will correct itself when the job is completed and final billing made.

Form W is a "War Production Register" showing how Contractor Smythe who had a sub-contract on war production totaling $25,000 would record his figures, which were taken from their respective accounts in the General Ledger. Smythe can get an idea of where he stands at any time by estimating the net on completed work not billed and work in progress. Theoretically, there should be no inventory left at termination. Any leftover should be considered at cost value and the necessary adjustment made. Inventory is computed from stock control cards or a physical count.

On other departmental accounts, the profit and loss statement should show the departmental profit as taken from the departmentalized accounts in the books and Form H (Cumulative Statement of Operating Ratios) filled out for each department to provide a quick review of departmental results. The need for Form H will be greater in the postwar period when many different lines, some entirely new, will be offered through warm air dealers and sheet metal contractors.

Don't Fit Business to a System

In this discussion, we show how your books could be modernized to take care of present-day requirements covering tax and war regulations. The contractor must adjust these fundamentals to his requirements. Tax laws differ with the states, transactions differ with contractors, regulations are continually changing, so we cannot show specific entries in all cases that would give as clear an idea of how books should be handled today as is possible by the method we follow of showing the revised bookkeeping forms needed to record all transactions. Never try to fit your business to an accounting system. Fit the system to your business—and it is this idea that we follow in this article. Trying to fit your business to an accounting system always brings headaches.

Retain records in a safe place because, tax, WPB and OPA auditors may want to see them at any time. Also keep all March 1942 records for OPA inspection regarding ceilings.

FORM W

War Production Register

Contract—Oil Diluting Tank. Year ———

Month Ending	Cost Materials	Cost Labor	Overhead Pro-rated	Over-all Cost	Completed Work Not Billed-cost	Work in Progress-cost	Inventory Cost	Net Profit	Billings
Jan.	$800	$450	$500	$1,750	$1,500	$200	$1,500		
Feb.	900	500	550	1,950	1,700	250	1,600		$2,000
Mar.	750	450	400	1,600	3,200	400	1,700		
Totals	$10,000	$6,600	$6,000	$22,600				$2,400	$25,000

Showing type entries on war production register. At the end of contract when contractor has completed all work and billings, he adds totals as shown to determine net profit.

In the meantime, he can estimate the net profit or loss each month by figuring the net on completed work not billed and work in progress, taking into consideration payments on contract to date.

Interpretations, Amendments, Easements To Existing Orders

CMP-4B's Annually

A REDUCTION in CMP paper work will have the result, after the first quarter of 1944, of eliminating two out of every three CMP-4B quarterly applications, with authorizations made on an annual basis.

A study of the 4-B applications received by WPB quarterly revealed that 79.9 per cent of the applications represented only 5.1 per cent of the carbon steel allocated. Almost 95 per cent of the carbon steel allocated, in other words, went out on 20 per cent of the applications.

The industry divisions, therefore, will authorize for the complete calendar year 1944 all 4-B applications for unimportant quantities of material. This will be of inestimable aid to the small businessman who needs only a minimum amount of steel, copper, or aluminum, since after the first quarter of 1944, he will not have to submit additional 4-B applications. Authorization to handle CMP-4-B applications for small amounts on this basis has been granted by the WPB Program Bureau.

◆

Evaporative Coolers

LIMITATION Order L-38, as Amended December 6, 1943, includes provisions for production and sale of Evaporative Air Coolers, as well as refrigeration and air conditioning equipment.

Evaporative coolers may now be sold on AA-5 or better priority, without specific approval from WPB, to the Army, Navy, Maritime Commission, War Shipping Administration, National Housing Administration, or any person requiring a cooler for any essential use shown on List C of Order L-38, as amended December 6, 1943.

Evaporative air coolers may be stocked for inventory or resale when War Production Board approval has been obtained on Form WPB-547 (PD-1X). Further detailed and complete information can be obtained from your local War Production Board office.

◆

Rejecting Rated Orders

CONDITIONS under which sellers may reject rated orders for failure to meet established prices and terms have been clarified through an amendment to Priorities Regulation No. 1.

The exception to the general rule that sellers must accept rated orders applies to persons who regularly sell only in multiples of a specified quantity and who receive rated orders for a number of items that is not a multiple of that quantity.

For example, a manufacturer who regularly sells his product only in standard shipping packages containing one dozen receives an order for 40 units of his product. The manufacturer may (1) fill the whole order or (2) fill it to the extent of 36 and reject it for four units.

The problem is further complicated when a manufacturer receives such an order with split ratings.

For example, assume that a manufacturer who sells his product only in standard shipping packages of a dozen receives an order for 30 units rated AA-4 and 20 units rated AA-5. In this case, the general rule is that amounts in excess of a multiple of the standard shipping package ordered at higher ratings may be included with amounts ordered at lower ratings if the manufacturer wishes to adhere to his standard shipping package and not fill the order as received. He may, in the assumed case, treat the order as one for 24 items rated AA-4 and 24 items rated AA-5 and reject it for two items. He may fill the order as placed if he desires, but if he does not do this, he must fill it as outlined above.

This clarification is contained in Interpretation No. 3 as amended January 4, 1944, to Priorities Rregulation No. 1.

◆

Interpretation No. 1 to PR No. 7

THE meaning of the provision permitting sellers to waive a certification on a purchase order has been clarified by the issuance of Interpretation No. 1 to Priorities Regulation No. 7 by the War Production Board.

A seller may not attempt, under this provision, to rate a purchase order which the buyer has not attempted to rate, despite the fact that the seller is permitted to waive the certification.

However, if a buyer has stated a rating on the order but failed to include the proper certification, the seller may include it if he is acquainted with the facts in the case and is certain the buyer has the right to use the rating.

Similarly, if the buyer has not shown a preference rating on an order but has otherwise informed the seller of the rating which he wishes to apply or extend, the seller may insert it on the order.

◆

Furnace Production Reports

THE monthly report of production, shipments, unfilled orders and estimated future production required of furnace manufacturers under the recently amended furnace order, L-22, should be filed by all furnace manufacturers whether they produce regularly or irregularly.

For example, if a manufacturer produces furnaces in January but does not produce subsequently, a report for January should be sent in and also one for February stating that no furnaces were produced during that month and that production has been discontinued.

Form WPB-3316, on which the monthly report is to be made, can be secured from the Plumbing and Heating Division, War Production Board, Washington 25, D. C.

How to do Maintenance and Repair Work Under L-79 (Effective Jan. 15)

EFFECTIVE January 15, our industry's procedure for doing repair and maintenance work is revised as follows:

(1) P-84 is revoked and you will not use it.

(2) L-79 is amended and will be used to get furnaces—gravity or forced air—coal burning only—cast iron or steel. You are not permitted to buy oil burning or gas burning furnaces under L-79.

There is some confusion on how to proceed, so the following examples are given to clarify the procedure.

(Case 1) Mr. Smith, a home owner, has a cast iron, coal burning, gravity furnace which you cannot repair. You judge its repairability on the same basis you used under P-84. Under L-79 Mr. Smith does not need any *priority rating* to buy this furnace. Suppose you are going to install the furnace on a contract. Make out the contract, but somewhere on the contract place the following certification and have Mr. Smith sign it as shown below—

> "I need the item shown in this purchase to replace equipment worn out, damaged beyond repair, or destroyed. I will not use it to replace usable equipment or to make a substitution which would provide more extensive facilities than are necessary to replace the parts worn out, damaged or destroyed.
> Address of installation.....
> Consumer's signature .....
> Address ....."

You, the dealer, then make the replacement. If you have to buy a furnace for this job you send your order to your jobber and on the order you place this certification—

"Preference Rating AA-3. The undersigned purchaser certifies, subject to the penalties of Section 35(a) of the United States Criminal Code, to the seller and to the War Production Board that, to the best of his knowledge and belief, the undersigned is authorized under applicable War Production Board regulations or orders to replace this delivery order, to receive the item(s) ordered for the purpose for which ordered, and to use any preference rating or allotment number or symbol which the undersigned has placed on this order.

"Signature of Authorized purchasing agent....."

Keep Copies of Both Orders

In order to be ready for any compliance officer it is recommended that you, the dealer, keep a copy of your contract with Mr. Smith, including a copy of his certificate; and also keep a copy of your order to your jobber with a copy of your certification. These should prove where you did the work, who bought from you, who you ordered from and why you replaced instead of repaired.

What the Jobber Does

On receipt of your order for a furnace for Mr. Smith, your jobber can basket your AA-3 order with other similar AA-3 orders and extend these to the furnace manufacturer over the standard certification shown above on his regular order—no form used. Or, more likely, the jobber will elect to let these AA-3 repair orders "die" and use his WPB-547 (formerly PD-1X) showing his pattern of ratings as provided. The jobber, also, for compliance purposes, should keep a copy to show where his orders went and for what purpose.

Furnaces From Stock

Supposing you keep some furnaces in stock from which to fill orders like Mr. Smith's. You obtain Mr. Smith's certification and extend the AA-3 rating just as described before—but your problem is how to keep an inventory.

Under L-79 (Section d) you are permitted to maintain a 60-day supply of furnaces. Suppose in June you want to start accumulating a stock of furnaces. From your records you should determine how many furnaces you sold in a typical year in July, August, September, etc. In June you can place an order with your supplier for as many furnaces as you used in July and August of your typical year. You can place on your order to your jobber the AA-3 rating and you can take delivery immediately. But you may not, strictly speaking, take delivery of furnaces which you expect to sell in September, October, etc., because then your inventory will exceed a 60-day supply.

However, the purpose of this new L-79 is to simplify procedure and put business back as usual, so it is perfectly in order for you, in June, to place with your supplier one order for all the furnaces you expect to sell up to January 1 and give yourself this AA-3 rating for repair work. However—you must specify delivery over the months so that at no time will the furnaces you have on hand exceed a 60-day supply. WPB reports that while some items may be accepted by the buyer beyond a 60-day supply when the order is for a "commercial quantity," this does not apply to furnaces. A carload furnace order which exceeds the 60-day supply (even though a "commercial quantity") is forbidden because furnaces can be ordered one furnace at a time.

This point is worth emphasis. You are the judge of what is a 60-day inventory.

Another procedure is for you to order in June furnaces for a 60-day supply specifying delivery immediately. Then, in July, place another order, but specify delivery in September. You can do this every month, if you wish, but your delivery dates should always be beyond your 60-day inventory period.

Never Had a Furnace

(Case 2) Mr. Brown never had a furnace, but wants one. Can he get a furnace? There is no "yes" or "no" answer, but there is a procedure under which Mr. Brown can "try" to get a furnace. A new application form WPB-1319 will soon be ready (meanwhile use WPB-2631) which Mr. Brown can fill out and mail to the local WPB for consideration. If approved, a priority rating will be extended to permit the dealer to get a furnace.

At present, most of these WPB-1319's are approved if Mr. Brown can show a hardship. For example, sickness in the house. Or a new baby. Or moving into a house without any heat and needing a couple of stoves to heat.

L-41, $200 Limit

This Case 2 also involves order L-41 (the construction order). If the cost of the furnace is $275 and the cost of installation is $175 the application is made on WPB-1319 to the local WPB. Automatically this meets the requirements of L-41.

But if the furnace costs $275 and the cost of installation is $225 the application must be made on WPB-2570 and must be approved by the processing division of WPB.

Note the dividing line is $200 *for installation.* There is some confusion on this. It is not $200 total furnace and installation, but is *installation only*—the cost of the furnace is not a problem under L-41.

There is, therefore, some procedure by which a furnace can be sold the owner who never had one. Approval is not automatic, it must be considered—but it is now legal and may place many furnaces in houses you have been turning down.

Sheets Secured Under CMP-9A

Amended order L-79, explicitly excludes sheets for repair from the order. L-79 (Section b 3) says—"Any rating under this paragraph cannot be used, however, to get equipment specifically designed for . . . steel or wrought iron pipe or steel sheets, etc" Sheets for repair and maintenance, therefore, should now be obtained under CMP-9A or CMP-4. A full discussion of this was published in the January, 1944 issue. Briefly —use CMP-9A for hurry up jobs where you need a *definite quantity of sheets for a specific job.* Use CMP-4 to get sheets to put into stock and take sheets for repair from your stock.

Blowers as Fuel Savers

Furnace blowers, many contractors can prove, save fuel when used to convert a gravity furnace to forced air. But blowers are also excluded from L-79—also in Section b 3.

To install a blower conversion to save fuel have the owner apply to the local WPB on form WPB 541. If approved, WPB will give an AA-5 or higher priority rating. AA-5 should get a blower. This is the procedure where the *installation* is under $200. If the *installation* is over $200, use form WPB-2570—same procedure.

We understand that some WPB offices are approving installation of a blower to save fuel and are assigning a priority rating of AA-5 to the dealer to purchase the blower. The application must be made to WPB *by the home owner,* but you, the dealer, can supply the form and can help the owner fill it out.

Whether or not your jobber or manufacturer can furnish you a blower with motor you will have to determine by trying.

Order L-79 In Full

PART 3288—PLUMBING AND HEATING EQUIPMENT
(General Limitation Order L-79, as Amended Jan. 15, 1944.)

PLUMBING, HEATING AND COOKING EQUIPMENT

Section 3288.31 General Limitation Order L-79, is amended to read as follows:

§ 3288.31. *General Limitation Order L-79*—(a). *What this order does.* The purpose of this order is to conserve the supply and direct the distribution of plumbing, cooking and heating equipment by preventing the sale of certain essential items on List A except for necessary replacements, or on rated orders. These are items, the production of which is restricted, and which can be made available to essential users only. The order provides a rating to enable sellers to get these items for necessary replacement. It permits other items of plumbing and heating equipment to be bought by sellers on unrated orders without restriction but provides a preference rating to enable sellers to buy these non-restricted items when a rating is needed. No preference ratings are assigned to consumers and deliveries to consumers for replacement and repair do not have to be on rated orders. The order supersedes the previous version of L-79, as well as General Preference Order P-84.

(b) *Assignment of preference ratings.* Preference rating AA-3 is assigned to any seller to enable him to get the following:

(1) Equipment shown in List A, including repair parts.

(2) Repair parts only for items on List B, and repair parts for stoves rationed by the O. P. A. under Ration Order 9-A.

(3) All other equipment, material and parts which are used to supply, store and heat water, to remove waste matter and water-borne waste, to treat waste matter chemically, and to heat buildings, including electric heat controls. Any rating under this paragraph cannot be used, however, to get equipment specifically designed for industrial processing, fire protection, the production or transmission of power, or for use by a public utility, equipment using electricity as fuel, heat exchangers subject to L-172, fans and blowers as defined in L-280, steel or wrought iron pipe or steel sheets, or equipment specifically designed for refrigerating and dehumidifying, or portable items such as pans or sump pumps which are not designed to be built into or fastened to the building in which they are used. Directions will from time to time be issued specifying items which are subject to this paragraph and items which are excluded.

(c) *Exception.* No rating is assigned to any delivery to which a rating is assigned by CMP Regulation 9A.

(d) *Inventory restrictions on sellers.* (1) A seller who is a repair man as defined in CMP Regulation 9A may not accept delivery of any item of parts or materials obtained by applying a rating under this order if his inventory of that item of parts or materials is or would by accepting delivery become larger than he needs to continue his repair and maintenance services for a 60-day period, according to his current method of operation. However, if the supply of any item which he has on hand is less than the permitted amount, he may accept delivery of the smallest commercial amount of that item, which his distributor normally sells, even if that will increase his supply beyond the amount specified.

(2) A seller who is not a repair man as defined in CMP Regulation 9A is subject to the limitation of inventory prescribed in Order L-63.

(e) *Up-rating.* In the case of ratings applied or extended by sellers under Order P-84 prior to its revocation, deliveries may be re-rated in accordance with the provisions of Priorities Regulation No. 12. However, any person with whom such an order was placed is authorized to treat it as re-rated without requiring any notice or certificate to be furnished to him by the seller: *Provided,* That any manufacturer or seller who re-rates any orders placed with him under this paragraph must so re-rate all orders placed with him which can be re-rated.

(f) *Restrictions on deliveries of items on List A.* No person may deliver or accept delivery of equipment included in List A of this order except:

(1) Equipment which has previously been used.

(2) Equipment which is delivered to fill a rated order.

(3) When the delivery is to a consumer for installation to replace existing equipment which is worn out, damaged beyond repair or destroyed, but not to replace useable equipment or to make a substitution which would provide more extensive facilities than are necessary to replace the part or parts worn out, damaged or destroyed.

(g) *When a consumer needs a preference rating and how he gets it.* Consumers are not assigned ratings by this order and will not need ratings unless they want to buy items on List A for purposes other than replacement. When a rating is needed, usually they can apply for ratings on Form WPB-1319[1]. However, if the material is to be used in new construction of a type which is restricted under Order L-41, the consumer must use the form specified in Schedule C of that order. Industries and government institutions may use CMP Regulations 5 and 5A ratings for repair parts and replacement items.

(h) *Consumer's certificates.* No seller may deliver an item on List A to fill a consumer's unrated order unless he obtains a certificate in substantially the following form:

I need the item included in this purchase to replace equipment worn out, damaged beyond repair, or destroyed. I will not use it to replace useable equipment or to make a substitution which would provide more extensive facilities than are necessary to replace the parts which are worn out, damaged, or destroyed.

Address of installation.....
Consumer's signature.....
Address .....

Any certification is a representation to the War Production Board as well as to the seller. No one may deliver relying on a certification being true if he knows or should know it is false, but anyone who reasonably relies on the truth of a certificate is not to be held responsible if it turns out to be false. No one shall make a false statement in a certification. Sellers shall retain certificates in their files for two years for inspection by WPB representatives.

(i) *Salvage.* No person may install equipment on List A for replacement unless he takes any replaced metal parts or equipment, not coated with a fused or nonmetallic surface, and arranges for its further use, or turns it in for salvage to any authorized scrap metal dealer within thirty days after the replacement. This requirement does not mean that the installer is entitled to take old equipment without the owner's consent or without crediting him with its value.

(j) *Records.* All persons affected by this order shall keep and preserve for not less than two years accurate and complete records concerning inventories and sales.

(k) *Audit and inspection.* All records required to be kept by this order shall, upon request, be submitted to audit and inspection by duly authorized representatives of the War Production Board.

(l) *Violations and false statements.* Any person who wilfully violates any provision of this order, or who, in connection with this order, wilfully conceals a material fact, or furnishes false information to any department or agency of the United States is guilty of a crime, and upon conviction may be punished by fine or imprisonment or both. In addition, any such person may be prohibited from making or obtaining further deliveries of, or from processing or using, material under priority control and may be deprived of priorities assistance.

(m) *Appeals.* Any person affected by this order may appeal from its provisions by filing Form WPB 1477 (formerly PD-500) with a field office of the War Production Board.

(n) *Communications.* All reports to be filed and other communications concerning this order, except appeals, shall be addressed to the War Production Board, Plumbing and Heating Division, Washington 25, D. C., Ref: L-79.

(o) *Definitions.* For the purposes of this order:

(1) "Seller" means any person who buys plumbing, heating, or cooking equipment for resale, whether or not he makes the installation.

(2) "Consumer" means any person who buys plumbing, heating, or cooking equipment for installation or use on premises owned or occupied by him.

Issued this 15th day of January 1944.

WAR PRODUCTION BOARD,
By J. JOSEPH WHELAN,
Recording Secretary.

LIST A

The following items of plumbing and heating equipment:

1. Furnaces, heating (as defined in Order L-22), and cast iron boilers, heating (as defined in Order L-187), but excluding furnace-burner and boiler-burner units in which the boiler or furnace is designed for use of oil or gas only as a fuel.
2. Water heaters, not electric or industrial (direct-fired and indirect, as defined in Order L-185).
3. Tanks, including range boilers and expansion tanks (as defined in Order L-199).
4. Cast iron tubular radiators.

LIST B

1. Commercial cooking and food and plate warming equipment as defined in Limitation Order L-182, as amended: all not electric.
   Bakers.
   Broilers.
   Fryers.
   Food warmers.
   Griddles: commercial cooking.
   Grills.
   Hot plates: commercial.
   Ovens: bake, except industrial type.
   Ranges.
   Roasters: commercial.
   Steamers: oven.
   Toasters: commercial.
   Urns.
   Warmers: food-plate.
2. Commercial dishwashing machines: not domestic: as defined in Limitation Order L-248 as amended.
3. Class A stokers: grate area 36 sq. ft. or less, capacity in excess of 60 lbs. per hour, as defined in Limitation Order L-75 as amended.
4. Class B oil burners: not designed specifically for shipboard use or heat processing; as defined in Limitation Order L-74 as amended.
5. Extended surface heating equipment as defined in Limitation Order L-107, as amended.
   Unit heaters: steam or hot water.
   Unit ventilators, heating: steam or hot water.
   Convectors.
   Blast heating coils: steam or hot water.
   Special heating coils: steam or hot water.
   Heat transfer element: metal: fin tube: for transferring heat from steam or water to air.
6. Steel boilers of types listed in Order M-293, Table 14.

PART 3288—PLUMBING AND HEATING EQUIPMENT
(General Limitation Order L-79, Revocation of Interpretation 1)

Interpretation 1 is superseded by provisions of General Limitation Order L-79, as amended January 15, 1944.

Issued this 15th day of January 1944.

WAR PRODUCTION BOARD,
By J. JOSEPH WHELAN,
Recording Secretary.

[1]A revision of Form WPB-1319 for this purpose was in preparation on the date of issuance of the order. Until it is completed and approved, applications should be filed on Form WPB-2631, formerly PD-851. Use of this form for this purpose has been approved by the Bureau of the Budget in accordance with the Federal Reports Act of 1942.

Interpretation To Construction Order L-41

To clarify some of the confusion over Order L-41 as amended November 1, 1943, the following is excerpted from recent WPB interpretations. "In most cases except where the construction is of a special kind, you must get permission from the War Production Board for construction. This permission (sometimes called 'authorization to begin construction') must not be confused with preference ratings or priorities. If a construction job is allowed, either because it is not of the kind restricted by this order or because permission has been obtained, it may still be necessary to get preference ratings for materials and fixtures which are needed. On the other hand, if you have ratings for materials, or materials on hand, you may still have to get permission to use them for a particular construction job.

Some of the Changes

"The limit of $200 on construction work for which WPB permission does not have to be obtained (which was already in effect for residential construction) is placed on *any type* of construction for which a higher specific limit is not authorized by the order. This overall limit formerly was $1,000.

"The limit on all farm construction, including residential, is placed at $1,000. Formerly there were separate limits for residential construction and general construction on the farm.

"Installation of plumbing or heating equipment rated on WPB-2631 (PD-851) is permitted, if the cost of installation (not including the cost of equipment) is less than $200. The former exception covering the conversion of heating equipment from oil to coal has been eliminated.

"Cost of used materials, or the value of labor furnished free, need no longer be included in calculating costs to determine whether a job is within specified L-41 limits. Also, cost limits now refer to the calendar year, instead of to any consecutive 12-month period.

Insulation Provisions Eased

"Provisions for the insulation of buildings without the necessity of obtaining WPB permission, originally contained in Order L-41-b, have been liberalized in accordance with the WPB policy relating to fuel conservation. The order now states that it is not necessary to get WPB permission for 'insulating buildings with materials such as storm windows and doors; pipe covering; loose fill, blanket or bat insulation; plain or granule surfaced rigid insulation; and weather stripping.

"Still permitted by the order are maintenance and repair work necessary to keep a building or structure in sound working condition or fix it when it has become unsafe or unfit for service because of wear or tear. Additions, structural alterations, or the completion of unfinished parts of buildings are not considered maintenance and repair.

"Rebuilding or restoring structures after damage caused by fire, flood, tornado, earthquake, acts of war, or the like, is not permitted as maintenance and repair. However, no special permission for residential or farm rebuilding is required if the cost is less than $5,000 and if the building was damaged or destroyed after July 1, 1943.

In a few special cases, some WPB preference ratings include permission for construction also. For instance, if a builder or owner receives a preference rating order on Form P-55-b (which relates to privately owned war housing which has been programmed), the construction provided for in this order is permitted by the WPB without the necessity of filing a separate construction application.

In Schedule C of the amended Order L-41 is a table listing the different application forms to be used in obtaining permission to begin construction and where to file them, unless otherwise instructed. These forms in the table are to be used whether or not priorities assistance or controlled material allotments are required. The table follows:

Types of construction	Application Form	Where filed
Farm construction, including farm buildings:		
Total cost less than $10,000	WPB-2570 (formerly PD-200-C)	Department of Agriculture County War Board having jurisdiction over site.
Total cost $10,000 or more	WPB-617 (formerly PD-200)	Do.
War Housing owned by FPHA	Letter	WPB, Washington, D. C.
Housing for 5 families or less per building:		
Total cost less than $10,000 or construction consisting only of remodeling or rehabilitation.	WPB-2896 (formerly PD-105) and WPB-2897-1.	FHA Field Office having jurisdiction over site.
Total cost $10,000 or more (except remodeling or rehabilitation)	WPB-2896 (formerly PD-105) and WPB-2897 (formerly PD-105A).	Do.
Hotels and apartment houses for 6 or more families providing additional living quarters for war workers.		
Total cost less than $10,000 or construction consisting of remodeling or rehabilitation.	WPB-2896 (formerly PD-105) and WPB-2897-1.	Do.
Total cost $10,000 or more (except for remodeling or rehabilitation.)	WPB-2896 (formerly PD-105) and WPB-2897 (formerly PD-105A).	Do.
Hotels and apartment houses for 6 or more families not providing additional living quarters for war workers:		
Total cost less than $10,000	WPB-2570 (formerly PD-200-C)	WPB District Office having jurisdiction over site.
Total cost $10,000 or more	WPB-617 (formerly PD-200)	WPB, Washington, D. C.
Public roads	PR 1 PA	State Highway Department having jurisdiction over the site.
Water, gas, steam, electricity, telephone facilities for use by the public	WPB-2774	WPB, Washington, D. C.
Factories, plants, and other industrial units:		
Total cost less than $10,000	WPB-617 (formerly PD-200)	WPB District Office having jurisdiction over site.
Total cost $10,000 or more	WPB-617 (formerly PD-200)	WPB, Washington, D. C.
All other kinds of construction:		
Total cost less than $10,000	WPB-2570 (formerly PD-200-C)	WPB District Office having jurisdiction over site.
Total cost $10,000 or more	WPB-617 (formerly PD-200)	WPB, Washington, D. C.

The "total cost" as used in the above schedule includes used materials and fixtures, processing machinery and equipment and architects', engineers', and contractors' fees although these are not included in "cost" for purposes of determining how much can be constructed without permission under pars. (c), and (d) of the order.

Arnold Kruckman's

Washington Letter

Will Government Take Over Business?

"EITHER the Government will take over big industry or big industry will take over the Government."

This startling statement was flashed around the country recently by the Associated Press, and was attributed to Dr. Arthur E. Morgan, in an address before the Institute of International Relations in Baltimore. Dr. Morgan, the first head of TVA, which he quit after a dramatic collision with Roosevelt, is also head of Antioch College at Yellow Springs, Ohio, and is noted for many extraordinary engineering feats, the one usually mentioned being the conservancy protection of Dayton, Ohio.

Dr. Morgan personally is noted for an almost fanatical integrity, a brilliantly incisive mind, and a diamond-drill hardness of thought in practical problems that contrasts oddly with his reputation for radical philosophy. He is genuinely one of those rare beings in human experience who may truly be classified as pure genius. It is important to understand and to know Dr. Morgan because he is the keynoter of this discussion on Business and Government. He has very sincerely a veritable passion to serve people, coupled with a stark selflessness and an amazingly wide and varied scholarship that sharply contrasts with his gaunt, clear, practical sense of business. While he may speak with a background of pure reason and ideal aspirations, he also speaks as a proven business man who may be placed in the category of Big Business.

The paragraph from which the Associated Press took the line quoted at the head of this letter reads thus:

"In my opinion, economic bigness, as we see it in America, is not inherently inevitable in all fields. With a higher level of economic education, I am of the opinion that in many fields smaller economic units may be at least equally efficient, and socially much sounder. Also, I believe, that is the only road to a continuance of private initiative in business. When the major part of our industrial life is in a few hands, nationalization of industry will surely follow. Either the Government will take over big industry, or big industry will take over the government. In my opinion, widespread private initiative can provide a variety and richness of life that bureaucracy alone cannot equal. The current is running strongly in the other direction (towards bureaucracy), but it is not necessary for every one to go with the current. The future may rest with those who do not."

Education Making Specialists

During the past half century there has been a tremendous over-emphasis in this country on formal education. The separateness of the Doctor, the Teacher, the Engineer with the trained instinct for orderly thought and action gave intellectual vocations something like a sacerdotal aloofness. With the rush to colleges and universities naturally came the product of technical specialization. And out of this came the overspecialization which produced the multi-split and re-split specialists who fined down to hairsplitting distinctions that made their discussons comparable to the specialists in the 7th or 8th century who came to an important crisis in human destiny because they could not agree on how many angels might dance on the point of a needle.

Apparently we must get back to simplification in order to realize what Government and Business really are. In this country, which is the country that really interests us, we started with the Town Meeting. The people who came together at the Town Meeting made the rules for their communal life and appointed the umpires who decided the application of the rules and assessed the penalties for infractions. This is the beginning and the end of the purpose of Government in America. The Bureaus and Agencies and Commissions and Departments and other parts of Government, as we now know it still were designed to umpire the plays and to police the performance.

Bureaus Becoming Dictators

But with the inevitable trend in human evolution the Bureaus, etc., gradually went from umpiring and policing to dictating the kind of plays we must make, and they have recently begun to tell us how we must play, who we must play with, what we must play with, and what we must do with the prizes we win with our plays. In this way the rules become policies and the umpire becomes the politician.

In the simpler days Government was a service performed chiefly for the kudos and distinction it brings to men. As we become more numerous, more complex, and our inter-relations were complicated, the politician becomes professional, trained and skilled,

and Government becomes a business for expert, experienced technicians. The multiplication of intricate rules, methods, systems, and procedures logically separates the Government machinery from the people who presumably are the Government. The most widely accepted estimate is that one out of every three families in the United States either directly or indirectly draw their living from Government, either Federal, State, City, County, or otherwise local. Census states there are 37,500,000 families in the United States. Each family is credited with one and one-half members. One-third of the families in the United States would total 12,500,000, and would roughly embrace 43,750,000 persons. Incidentally, it is estimated it costs approximately $10,000,000,000 annually to pay the expenses of the Federal Government in normal times, and $11,000,000,000 to pay the expenses of other non-Federal Government units.

Naturally there are vast numbers of persons who have spent their adult lives either in politics, or living on politics; and the other two-thirds, who lose touch with the details of the game in which they are the players, inevitably accept the guidance of the professionals who make it a business. This particularly applies to the worker, the smaller business man. It is literally impossible for him to know the facts of politics. Dr. Morgan stated that a recent Gallup poll revealed that 88 per cent of Americans classified themselves as middle class; six per cent put themselves in the upper class, and six per cent put themselves in the lower class. It would be interesting to know in what class Big Labor and Big Agriculture placed themselves. Big Business, the other member of the triumvirate, obviously is upper class. These and other specialized groups logically have direct relations with the political parties, outside of Government, which are the prototypes of the much belabored pressure groups.

Legislation by Pressure

Speaking presumably of the middle-class, Dr. Morgan said: "Americans still feel that they have a stake in the structure of American life, and may resist extreme action in any direction. They will not want to stand still, but will try to keep within reasonably safe speed limits." Among these Americans we find the groups with identical practical interests who get together to have a hand in the game as a matter of self-protection. They are usually miscalled pressure groups by other groups which strive to exert influence for frankly selfish purposes. The groups with the greatest means, Big Business which practically includes Big Labor, Big Professionals, and similar powerful groups, employ expert skill and experience and training and knowledge to obtain special attention. There is no impropriety in the essential effort because every one is free to do the same thing.

The group which is greater in individual numbers has more difficulty in combining for a similar purpose, and it follows that the Big groups, much more highly concentrated, far fewer in individual numbers, able to focus their wealth with more mobility, are more powerful in securing preferential rules, and in playing the game with tools that give them a better break. We often hear sinister implications about the activities of the 200 primary groups of the American economy, but it unquestionably is true that in the large the Big groups are no more unethical than any other group. The liaison, such as there may be, between the Big groups and those who make the policies and umpire the rules that are the fruit of the policies, is inevitable and natural.

It is simple logic that those who make the machinery of Government function should find they have a greater affinity for those organized groups which exert great power. As a matter of fact it is doubtful if in a country like ours Big Business can take over Government or Government can take over Big Business. It is more likely they integrate, blend, by natural interweaving. In England, Eric Johnston of the Chamber of Commerce of the United States tells us, Government is expected to take over banks, transportation, mines, insurance, most manufacturing, the majority of the parts of the domestic economy. But shipping, chemicals, and other international business will remain in private hands. These are the economic units jointly owned by international groups or private individuals.

Apparently it is often the purpose of those who dominate the Government policy makers, and those who dominate the operation and ownership of the economy, to accomplish identical ends: to control the rule making machinery, the umpires, the game, and the tools with which the game is played. The ultimate object is the same, power, place, distinction. Wealth is the means. The "strong" men run the game, and it is reasonable to expect the strong men will come from both sides, just as it is reasonable to expect the next stage of the game may be new rules, new tools, new policies, as well as new umpires.

Practical vs. Theoretical

It is inevitable that WPB, OPA, ODT, WMC, WLB, etc., and the new regulations, will have a permanently modifying effect upon our life. The dream on one side is to make the game open to players everywhere on the globe, and to share the fun and the prizes with all the people in the world who will play the game under our rules. This school, reflected in the published thought of Mordecai Ezekiel, Justice Frankfurter, and Economist Laski of England, would make this altruistic sharing chiefly a gift up to a certain point of irreducible needs, somewhat outlined in the President's recent New Bill of Rights. This would lift some people up and level others down, but in theory would lift the level of the average. The late Arthur Balfour once said that England had developed the finest individual peaks of cultural excellence in the world's history, and that America had developed the finest average level of human cultivation.

The Big Business Man is an individualist. He believes you are entitled only to that which you can earn. He believes in bringing down prices to make it possible for more people to buy his goods, and he believes more people should have the means to buy more goods. It is almost inevitable that clarity of thought and definiteness of purpose and specific objects are more successful in attainment than broad general aims. It therefore seems reasonable to assume that the simpler and clearer aims of the Big Business Man may be more effective than the more involved objectives of the altruist.

There is one factor, however, which may discourage both the Big and the Smaller business man. When this war is over there will be huge taxes. At least sincere students of our finances such as Senator Byrd estimate our annual overhead will total approximately $19,000,000,000. It is made up of these items:

(*Continued on page* 92)

On Our Industry's Front

Copper Recovery Branch Organized

THE Copper Division of the War Production Board has organized a new branch, "Copper Recovery Inventory Branch," located in the Empire State Building, 350 Fifth Avenue, New York 16, New York. This Branch is an outgrowth of the Copper Recovery Branch of the Copper Division, formerly located at the offices of the Copper Recovery Corporation, 200 Madison Avenue, New York City.

Although the Copper Recovery Corporation and the original Copper Recovery purchase programs are being concluded, the need still exists for redistributing copper and copper-base alloy material on an "as is" basis, i.e., for use in its existing form. The new branch will continue to perform this function. The Copper Division, through its Copper Recovery Branch, since the inception of the various Copper Recovery programs, has arranged for use "as is" of approximately 112,000,000 pounds of copper and copper-base alloy material.

All holders of surplus copper and copper-base alloy material in primary form are urged to report promptly such material to their Regional or District Office of the War Production Board, indicating the weight of the material together with a complete description including dimensions, alloy, temper, and any other pertinent information. The Regional Office, will, if possible, find a buyer. If it is not successful in this, the Regional Office will turn over, all such unsold inventories to the Copper Recovery Inventory Branch, for disposition on a nation-wide basis.

Those requiring and those who are entitled to buy copper and copper-base alloy material, such as rod, sheet, tube, wire, etc., are urged, before placing their orders with their regular suppliers, to first determine whether the material is available in surplus inventories. If so, delivery may often be obtained much more promptly.

When making inquiry for copper or copper-base alloy material, the buyer's C.M.P. Allotment Number should, in all cases, be furnished to the Copper Recovery Inventory Branch. Under certain circumstances, it may be possible for the purchaser to obtain material without making any adjustment in his C.M.P. Allotment, i.e., he may, under certain conditions, receive the material in addition to the quantity allotted to him, but only for use for the same purpose for which his C.M.P. Allotment was issued.

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Sheet Metal Well Casing Rationed

SHEET metal water well casing has been rationed, beginning December 15. The action is provided in Supplementary Order 6 of Food Production Order 14.

This type of well casing is made of flat steel sheets which are rolled and welded or riveted into sections. It is used chiefly by farmers in the West and South and is not to be confused with well casing fabricated by pipe mills.

In the rationing of sheet metal well casing, an exemption of $100 per well is allowed so that farmers needing small amounts for supplies or maintenance, or for sinking small wells, will not be required to obtain ration certificates. Persons wishing to use a quantity of the casing costing more than $100 (retail value) for any one well will be required to obtain a purchase certificate from their County Farm Rationing Committees. Applications will be filed on Form MR-120c. Information required on the form will determine whether the county committee will issue the applicant a purchase certificate or disapprove the application.

◆

"Low-down" on Cutbacks

FOLLOWING is a January 7 report from the office of war production, based on data from the Navy, the Army, the War Production Board, and the U. S. Maritime Commission.

None of the curtailments, or "cutbacks," to date has been based upon plans for resuming manufacture of civilian goods. No considerable curtailments for that purpose can be scheduled during 1944 unless the war in Europe should take an early decisive turn in our favor, ending hostilities not later than June or July. Until then, whatever resumption of civilian production WPB permits must be considered purely as temporary, and subject at all times to a return to military production when required.

The present series of adjustments in war production and those projected for coming months are dictated by:

(1) Changing military requirements resulting from combat experience.

(2) Overproduction of some raw materials and military equipment.

The consensus of officials of the Army, and civilian war agencies is that any return to civilian manufacture during the year, beyond the 2,000,000 electric irons and 50,000 bathtubs recently authorized by the War Production Board, will probably be in goods necessary to maintain the civilian economy.

Chief cutbacks during the coming months, according to military and civilian war agencies, will come in small arms and ammunition, tanks, certain types of anti-aircraft equipment, non-combat aircraft, and artillery fire-control equipment. More than offsetting this will be an almost doubled production of combat aircraft, with greatly increased emphasis on bombers, a tripled requirement for high-octane gasoline, and other expansions in merchant shipping (an estimated 1,000,000 deadweight tons) trucks (about 50 per cent), electronic equipment, heavy guns, heavy artillery shells, ground ordnance, and signal items.

The Navy has projected plans for plane production into 1945 and for its shipbuilding program through 1947. The shipbuilding program calls for completion in 1945-47 of more than 500 combatant ships, about 400 patrol and mine craft, more than 600 auxiliary vessels and more than 70,000 landing craft.

The Navy reports that its principal cutbacks during the past six months are:

(*Continued on page* 71)

Laws and Regulations Covering the Employment of Teen Age Youth

This article was planned as a part of the American Artisan "Manpower Study" in the January issue. Space did not permit its use. It is suggested that if you plan to use the "Manpower Study"—file this article with the others. This problem may again become acute next summer if manpower shortages continue.

THREE Government agencies recently issued a statement of policies and standards for the guidance of urban communities in establishing part-time school and work programs. The projected programs are to meet manpower needs in areas of acute labor shortage while insuring full educational opportunities for boys and girls under 18, in line with a national back-to-school campaign.

In many areas thousands of additional high-school students have been drawn into the labor force. In some cases, students have been recruited when adult workers were still available. Some of these students are employed before or after regular school hours and on Saturday. Large numbers of those engaged in after-school and other part-time employment, moreover, are engaged in work for which they are not suited and which, frequently does not make any particular contribution to the war effort, and often in work under conditions which are detrimental to their health and welfare.

The War Manpower Commission, the Children's Bureau of the U. S. Department of Labor, and the U. S. Office of Education have concurred in the following statement of policies, standards, and principles governing their application. These have been formulated to safeguard the health and educational development of in-school youth and to assure the most effective utilization of their services in meeting nonagricultural manpower needs.

Basic National Policies

In-school youth should not be included in any employment plan until other sources of labor have been exhausted and employment of youth under such a plan should be curtailed or terminated as other sources of labor become available. Where employment of these youth becomes necessary, the following principles and minimum standards for their part-time employment in nonagricultural occupations should be observed. By part-time employment is meant employment either before or after school, on Saturdays, or during school holidays and vacations, or during school hours when it is possible to adjust school schedules without undue interference with students' progress.

1. The War Manpower Commission is responsible for determining the overall manpower needs and for developing programs to meet those needs. When the Area Director of the War Manpower Commission determines that the part-time employment of in-school youth will contribute to meeting the essential manpower needs of a community, he will consult with and make recommendations to the local educational authority concerning the establishment of a student-worker program.

2. The local educational authority will decide, on the basis of such recommendations, and the recommendation of an advisory committee as provided for in paragraph 3, whether a student-worker program for the part-time employment of in-school youth is feasible and should be organized. If such a program is to be organized, the high schools from which students will be drawn should be designated; plans should be approved for in-school organization including the selection of students, follow up methods, and records and reports; and the supervisor or coordinator should be selected who will have charge of the program in each school.

3. A local advisory committee composed of designated representatives of business, industry, the press, organized labor, and other groups concerned with the employment and welfare of youth should be appointed by the local school authority. In communities where fewer than 50 student workers are likely to be involved there is probably no need for an advisory committee.

4. The U. S. Employment Service will contact employers for the purpose of receiving employer orders, determining job requirements, and working conditions offered. The school representative may follow up students on the job for the purpose of determining the probable effect of the work upon their school progress, health, and well-being.

5. Designated representatives of the local schools will give counseling service to students regarding part-time employment, and will select those students who are interested in and qualified to accept employment under the student-worker plan and will refer these students to the employment service for placement. Referrals should be accompanied by specific recommendations regarding the type and extent of employment in which students should be placed, their employment qualifications and other prerequisites to successful placement.

6. The designated representative of the local school authority should refer students to employers direct only in accordance with arrangements which have been agreed upon by the U. S. Employment Service and the school authority.

Recommended Minimum Standards

Federal and State Laws

Child-labor laws, school-attendance requirements, and other regulations embodied in State and Federal laws should be fully observed. The following minimum employment standards should not be construed as warranting any relaxation of State and Federal laws or the lowering of standards embodied in these laws.

Minimum Age

Students under 14 years of age should not be employed full-time or part-time as a part of the hired labor force.

Students under 16 years of age should not be employed under the following circumstances:

(a) In any work which would preclude a regular and full school schedule of class work and study; or

(b) In manufacturing occupations.

Plans for employment of students who are 14 and 15 years of age should not be made so long as students of 16 and 17 years are available for the work.

Age Certificates, Consent of Parent

Students should not be employed without an employment or age certificate, or in case such age certificate is not legally provided for, other reliable proof of age. In all cases there should be written evidence of parental consent. Where a physical examination is not already required for issuance of an employment certificate, the student should be given, wherever possible, a physical examination to determine his fitness to carry the proposed employment in addition to school work.

Hours and Night Work

Part-time employment should be limited to hours which the student can carry in addition to his school program without detriment to his health or interference with progress in school. The following standards are maximum hours and for many individual students shorter hours will be necessary. In general, students under 18 cannot successfully carry a combined school and work program of more than 8 hours a day.

For students 16 *and* 17 *years of age:*

(a) Daily hours of employment should not exceed 4 on school days nor 8 on days when school is not in session. In no case should the combined hours of school and work exceed 9 a day.

(b) Weekly hours of employment should not exceed 28 during weeks when school is in session, nor 48 hours in weeks when schools are not in session.

(c) Evening employment should not extend beyond 10 p.m., and in all cases students should be allowed at least 9 consecutive night hours free from employment.

For students 14 *and* 15 *years of age:*

(a) Daily hours of employment should not exceed 3 on school days nor 8 on days when school is not in session. Combined hours of school and work should not exceed 8 a day.

(b) Weekly hours of employment should not exceed 18 during weeks when school is in session, nor 40 hours in weeks when school is not in session.

(c) No employment after the hour of 7 p.m. or before the hour of 7 a.m. should be permitted.

Day of Rest

One day of rest in 7 should be allowed free from employment.

Hazardous Occupations

Students should not be placed in any occupation dangerous to life or limb or detrimental to health or well-being. In no case should students under 18 years of age be employed in any occupation defined as hazardous under State or Federal child-labor laws or regulations or by advisory standards, issued under the title "Which Jobs for Young Workers", of the Children's Bureau, U. S. Department of Labor.

Wages

Student workers should be compensated at the same wage rates paid adult workers for similar job performance. Wages paid student workers engaged in various occupations should conform to the provisions of Federal and State laws, and in no case should the wages be lower than the minimum set under the Fair Labor Standards Act for the same or comparable work in establishments producing goods for shipment in interstate commerce. In any case wages paid to student workers should be in accordance with any collective bargaining agreement that may be in effect in the establishments in which students are placed.

Other Safeguards

Adequate meal and rest periods should be allowed and adequate sanitary facilities and safety measures provided.

Special Provisions for Girls

Special limitations on employment of 16 to 18 year old girls were set forth by the Secretary of Labor, November 11, 1942. Under this exemption to the Act, which prohibits the employment of girls under 18, the bars are let down to permit employment of those between 16 and 18 years of age, providing such employment is for no more than 8 hours in any one day. The work period is limited to the hours between 6 a.m. and 10 p.m. Moreover, when State laws governing hours of work for women and children set stricter limits, then they must be met. No girl under 18 may be employed in any operation, or occupation, which under the Fair Labor Standards Act or under any State law or administrative ruling is determined to be hazardous in nature or dangerous to health; nor can she be employed at less than the minimum hourly rate set by, or under, the Fair Labor Standards Act or the Walsh-Healey Public Contracts Act for the industry in which the exemption is granted. A specific and definite lunch period of at least 30 minutes must be regularly granted. Lastly, the contractor must obtain and keep on file a certificate of age showing that the girl is at least 16 years old. Failure to comply with any of these conditions will incur the $10 per day liability.

Notice!

The first annual convention of the newly organized Sheet Metal Contractors National Association will be held in Chicago on April 27 and 28. The place will be the La Salle Hotel. A report on the program will be published as soon as the program committee has completed arrangements. In view of the necessity for increasing the dues, every member should come to discuss the problem. Also, since the hotel situation is acute, make your reservations now.

History of the NATIONAL WARM AIR HEATING and AIR CONDITIONING ASSOCIATION

By . . . ALLEN W. WILLIAMS

CHAPTER II

Air Conditioning Comes to Front

CINCINNATI was selected as the place of the December, 1933, meeting. This event marked the twentieth anniversary of the Association and represented twenty years of active, strenuous, cooperative service. It is significant to note that the Association not only successfully withstood vicissitudes of a war and a marked depression but each year prospered and grew in membership.

Association Name Changed

For sometime the Association had felt that its name, the National Warm Air Heating Association, should be changed in order to identify the organization with other phases of air conditioning besides heating, so it was proposed that the name be changed to the National Warm Air Heating and Air Conditioning Association. While it was agreed that was a rather long appellation, it was so descriptive and proper that the change was made accordingly.

During the fall of 1933 and for the first time in four years the members of the Association were able to report an increase in the demand for their products and consequently in production. That, together with the prediction of recognized authorities of a resumption in home building during 1934 was a great encouragement to all concerned.

In December, 1934, W. L. McGrath had served two years as president. He was succeeded by H. T. Richardson, president of the Richardson and Boynton Company, New York.

National Housing Act

It was at this time that the National Housing Act, which provided for the creation of Home Credit Insurance, Inc., became a law, the government allocating $200,000,000 as capital stock for the purpose of insuring all types of approved financial institutions against losses resulting from loans made for repairing or building of houses and permitting loans to the extent of 80% of the value of new homes and 60% on existing homes.

This plan when put in operation greatly stimulated every durable goods industry and naturally increased the demand for furnaces. The Association realized this meant the rebirth of home building and spent much time and effort in familiarizing its members with the provisions of the act.

Research in Summer Cooling

It was during 1933 that the Association's research activity commenced the study of summer cooling in the Research Residence from which the industry learned a lot about solar radiation, the effect of awnings, the cooling effect of night air and the principles governing its use and cooling with mechanical refrigeration, ice or water.

Something happened in 1934 which was most gratifying to the members of the Association all of whom counted Arthur C. Willard their personal friend. It was the announcement that Professor Willard, who had a few years previously become Dean Willard at the University of Illinois, had been elected president of that great institution.

"Gravity Warm Heating" Printed

In 1934 the Association determined that the research data relative to gravity heating should be tabulated, indexed and published in book form. This was the result of a suggestion by Mr. Sedgwick, chairman of the Research Advisory Committee, that the president of the Association appoint a committee to investigate the subject and if possible present a plan that might make the desired volume a reality. That committee was appointed and consisted of F. L. Meyer, Professor A. P. Kratz, Professor S. Konzo, W. J. Hennesy, J. D. Wilder and Etta Cohn.

Edwin A. Scott, editor of "Sheet Metal Worker," generously agreed to look after the make-up and printing of the volume which would be edited by J. D. Hoffman, chairman of the Association's Installation Codes Committee. This volume of some 500 pages was prepared, printed, copyrighted and distributed in 1935 and proved extremely popular.

Short Course

The establishment of a three or four-day "Course" in furnace heating came from the general need for a brief training for heating contractors and engineers in the developments from the Association's research activity and in how correct installations should be made.

Where such a school could be held was a question which was solved by the cooperation of Dean H. B. Durks and Professor Lorin G. Miller of the Michigan

State College, East Lansing, Michigan, and the generous willingness of that institution to grant its facilities for the annual sessions.

The Association willingly sponsored the Course and enlisted many of its members and their engineers as instructors. This arrangement not only provided a fairly centrally located place for the school, but made it possible to offer the course to those interested at a very nominal cost with the necessary classrooms, laboratory and talent available. The attendance increased at each annual session of this school and it has been continued each year as a valuable help to the industry and to the public.

Air Conditioning Becomes Recognized

By this time the furnace industry had reason to believe air conditioning was just around the corner for quite general use in homes. In other words, the furnace system could and would furnish all of the other phases of air conditioning in addition to heating. It was conceded, however, that many new houses as well as those already built would still be limited to a central plant which would supply heat only. Others would not only have heat but proper humidity and air motion, which air would be filtered, and then there would be still others which would have summer cooling in addition.

As air conditioning was, to the average person, synonymous to summer cooling, the public was confused by the too liberal use of the term by manufacturers, heating contractors and builders. This made it necessary for the Association to lead a successful movement which would distinguish to people a house which furnished winter air conditioning or summer air conditioning or both.

Air conditioning made it necessary for the Association to emphasize to its membership that the new features called for still better merchandising and more engineering and that there was no place for the amateur or tinker when it came to the installation of modern furnace plants. The situation was also complicated by the inclination of distributors, who were none too well posted, to leave the matter of lay-outs to the manufacturers of the goods sold thus placing an additional burden and expense upon the latter. At one time and until the condition changed the Association seriously considered establishing an engineering service in its headquarters to which plans might be sent for lay-outs.

Dealer Engineering Fostered

There is no question but what the Association deserves credit for encouraging the merchandisers and the heating contractors in the furnace industry to gain a fair knowledge of the engineering necessary to make their own lay-outs and to take the fullest advantage of the opportunity which scientific furnace air conditioning offered to the industry.

The industry was fortunate in its trade press. There was so much new and of vital importance to be published about air conditioning that at considerable expense these magazines established special sections of many pages and added to their staff competent engineers, all of which was a very material help.

During 1935 a special fund for oil burner research was established. Seven of the leading oil burner manufacturers subscribed a total of $1550 which made possible the publication of much needed data relative to oil burners.

Among the radical changes which air conditioning made in the products of the industry at this time was the design of very different registers from those used in gravity installations. This need was promptly supplied by the register manufacturers and included the directional-flow register which has meant so much to mechanical heating and summer cooling.

Another new feature which air conditioning developed in furnace installations was the use of rectangular ducts in basements instead of the larger round leader pipes. These rectangular ducts made for a saving of space in the basement and improving its appearance. At first these ducts were made by the heating contractor in his own shop but it was not long before the progressive manufacturers of furnace pipe and fittings were furnishing them in stock sizes.

Joint Session With ASHVE

At the 1936 convention, which numbered in attendance more than five hundred, the National Warm Air Heating and Air Conditioning Association and the American Society of Heating and Ventilating Engineers got together in a joint session. President H. T. Richardson of the Warm Air Association and John Howatt of the Society, presided as Chairmen. The attendance at this joint meeting was recorded as between eight and nine hundred, the Grand Ballroom of the Hotel Stevens being required to accommodate those present.

At this meeting outlines of the research work of the two organizations were given and on the evening of that day all present were privileged to attend a banquet in the Palmer House sponsored by the American Society of Heating and Ventilating Engineers.

The International Exposition of Heating, Ventilating and Air Conditioning was held at the same time as this 1936 convention.

First NWA-ASHVE Meeting

The plan of a joint session of the two organizations at the time of the biennial exhibitions of heating and ventilating equipment proved such a success in every way that it has been continued ever since.

At this meeting Doctor Hoffman, chairman of the Installation Codes Committee, announced that while the so-called Practical Code for the Installation of Mechanical Warm Air Furnace Plants would be continued because it had proved satisfactory, in the near future his committee would complete the formation of what would be known as the Technical Mechanical Code, more practicularly for use by engineers.

As an indication of the variety of subjects which the National Warm Air Heating and Air Conditioning Association was studying and promoting, the programs for its 1936 conventions included such topics as:

Federal Housing Act
Insulation, Why and How
Application of Gas to Warm Air Heating Systems
Room Surface Temperature of Glass in Windows
Merchandising in Our Industry
Combination Furnace Heat and Cooling Plants
Bituminous Coal Industry's Program of Research in Domestic Heating
Domestic Stokers
Summer Cooling
Performance of Oil Burners in Furnaces
Mechanical Heating Controls

RESIDENTIAL AIR CONDITIONING

SECTION

DEVOTED TO HOME AND SMALL COMMERCIAL AIR CONDITIONING

AEROFIN

Heat Exchange Surface

ALL STEEL COILS

CONSTRUCTION

• **TUBES**—Heavy .049" wall thickness low carbon steel-seam welded tubes—offset to expand or contract under all temperature changes. Protected with a coating of solder over the exterior surface.

• **FINS**—are of low carbon steel spirally wound around the tubes in such a manner as to secure the maximum contact between prime and extended surfaces. Fins are protected with a coating of solder which also forms a *permanent metallic* bond between fin and tube. No falling off of transfer with usage due to loosening of the bond between fin and tube. Different spacing of the fins on the tubes makes available varying temperature ranges and thus permits accurate selections to meet the requirements of the engineer.

• **HEADERS**—of large diameter pipe insure adequate steam supply. All connections are male pipe thread.

• **TUBE JOINTS**—are made between tubes and headers by brazing.

• **ORIFICES**—in the inlet end of each tube insure equal distribution of steam through all tubes.

• **CASINGS**—are of heavy gauge steel and have the same standardized dimensions as copper Aerofin Flexitube coils.

• **TYPES OF SURFACE**—steel Flexitube heating coils are available in three fin spacings and in one or two rows of tubes in depth, allowing a wide range of selection to meet temperature rise requirements.

Write for complete technical literature on your specific problem.

AEROFIN is sold only by Manufacturers of Nationally Advertised Fan System Apparatus.
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Some "Low Down Facts" on

So-Called "Coal Savers"

A VARIETY of chemicals again are being offered to the public with the representation that their use will affect savings of as much as 50% in the coal bill. A free bulletin on this subject has been printed by Nat'l Better Business Bureau, 405 Lexington Ave., New York City. The bulletin points out these facts:

The United States Bureau of Mines has revealed that the question of whether the burning of coal can be improved by the addition of small quantities of chemicals is over 100 years old. The earlier patents on the subject called for the use of up to 80 pounds or more per ton, but after 1860 the quantity was rarely more than 4 pounds.

Because it continually received inquiries as to the effectiveness of these proprietary products the Bureau of Mines tested some of them and reported that:

> ". . . the results were all negative and, within the accuracy of measurements, the products had no effect on the burning."

Another reference to the test results is given by the Bureau of Mines in the following summary:

> "The tests of eastern coals treated with certain proprietary products showed that the treatments made no difference in the results within the range of duplication possible in tests of commercial boilers operated under conditions simulating normal operation. The tests definitely disproved the claims of the vendors for large saving of fuel, elimination of smoke and soot deposits, reduction of clinkering, or any other change measureable in such tests. Similar tests using Rhode Island anthracite also gave negative results."

Analysis by the Bureau of Mines has shown that the chemicals used in the proprietary "coal savers" have included the following items (anhydrous basis):

Aluminum oxide	Manganese dioxide
Ammonium chloride	Molybdenum oxide
Boric acid	Nitric acid
Calcium chloride	Potassium chlorate
Calcium hydroxide	Potassium dichromate
Chromium trioxide	Potassium nitrate
Copper carbonate, basic	Potassium permanganate
Copper dichromate	Silica
Cupric chloride	Sodium borate
Fluorspar	Sodium carbonate
Lead chloride	Sodium chloride
Lead nitrate	Sodium silicate
Zinc sulphide	

The main investigation of the Bureau of Mines, which was made from 1934 to 1936 was to attempt to measure any effects of the chemicals themselves, rather than proprietary formulae. More than 375 tests were made. These tests showed that under favorable conditions certain chemicals caused appreciable changes when using 20 to 40 pounds. Bureau of Mines Bulletin 404, stated:

> "Anything, however, small in quantity, added to a fuel makes it a different fuel, and, in most instances, the effect of even 4 lb. of chemical was of measurable magnitude. The changes, under what will later be defined as favorable conditions, were appreciable when using 20 or 40 lb. of certain chemicals, but in all tests and under all conditions when using 4 lb. any differences between the results of tests without and with treatment were so small that one could not have positively attributed them to the chemicals if the tests had been made in commercial furnaces; moreover, the magnitude of the changes was less than any that would be produced by a chance change—for instance, in the size of the fuel, the attendance, or the setting of the dampers."

Federal Trade Commission Action

It will be noted that the Bureau of Mines refers to "light treatment of the order of 4 *pounds* of chemical per ton of fuel." The vendor of one proprietary product now on the market advocates that slightly less than 2½ ounces of his chemicals, which he sells for 35 cents, be used on ¼ ton of hard or soft coal. Another manufacturer whose claims recently were investigated by the Federal Trade Commission had two sizes of packages: 2¼ pounds, selling for 60 cents, which he claimed would treat THREE tons of coal and a 12-ounce size package, priced at 25 cents, which was supposed to treat a single ton. This firm claimed:

> "Every shovelful of coal you burn represents so much cash. In ordinary heating much of the coal gases is wasted in the chimney. Economy Coal-Saver creates oxygen and aids in burning these gases . . . It is equally effective as a soot destroyer and smoke reducer. It helps burn the soot and carbon. Save up to one-third with Economy Coal-Saver."

But the Federal Trade Commission found that:

> "The foregoing statements and representations are false, misleading, and deceptive. In truth and in fact, the use of respondents' said product will not create an amount of oxygen sufficient to affect in any manner the combustion qualities of coal. It will not aid in burning gases created in the combustion of coal. It will not save one-third or any other appreciable amount of the cost of coal. It will not make coal burn better and create a steadier, more even heat. It will not reduce ashes, soot, smoke, and dirt in appreciable or measurable quantities, and it will not save labor in handling coal and ashes. It will not purify the air of gases resulting from the combustion of coal. It will not reduce evaporation and help preserve the heating elements in coal, and it is not the newest and biggest money-making specialty ever offered sales people."

SPECIFICATIONS FOR FURNACE CONDITIONING

As developed by Better Home Heating, Inc., of which we are an active member

1. Complete inspection of furnace, checking for leaks, broken parts, cracks, warped doors or grates.

2. Check warm and cold air pipes, and inspect all register connections for leaks, or for hot water plants, inspect boiler thoroughly for water leaks.

3. Take down smoke pipe and vacuum clean thoroughly.

4. Inspect twist damper in smoke pipe to make sure it is in proper working order and placed correctly in the system, with relation to the check damper. (If not functioning properly, this damper can cause a great waste of fuel.)

5. Clean radiator of furnace, or flues of hot water plant.

6. Clean out and scale inside of furnace, which includes feed section, firepots, grates, and inside of doors. Special wire brushes, scaling tools and vacuum cleaner to be used in this operation.

7. Remove ashes and clinkers from ash pit. Place in container furnished by customer.

8. Recheck ash pit door and damper fittings.

9. Cement clean-out extension and smoke collar.

10. Adjust grates so they mesh properly and shake freely.

11. Clean lower chimney from smoke pipe opening to base.

12. Check upper chimney for obstructions of any nature.

13. Re-cement smoke pipe into chimney and furnace.

14. Vacuum clean outside of furnace.

15. Vacuum clean outside of cold and warm air pipes, or water pipes (in furnace room only).

16. Brush with wire brush the metal parts of the front of furnace, and if desired by customer, paint with special heat resisting paint (aluminum paint will not be obtainable this year).

17. Remove all cleanings gathered by vacuum cleaner from basement (does not include ash removal—special city license is required for this).

18. Vacuum clean floor around furnace.

19. Check and oil regulator chains (if not broken).

20. Report any *necessary* repairs to customer, with approximate cost.

21. Final inspection, and report guaranteeing that all above steps have been completed.

RATES FOR 21-POINT FURNACE CONDITIONING

HOT AIR PLANTS **$4.95**
(If the inside of the hot and cold air pipes are to be cleaned, there will be an additional charge of 30c for each run.)

HOT WATER PLANTS **$5.95**

PIPELESS FURNACES **6.95**

SOLID FUEL FOR HEALTH AND COMFORT

"Better Home Heating"—

A Program for Honest Furnace Cleaning

IN THE Twin Cities—Minneapolis and St. Paul—a most unusual and a highly interesting experiment has been under way for two years. It is a program known as "Better Home Heating," which proposes to solve the perplexing problem of making and keeping coal users comfortable and satisfied. It stems from a realization that, says A. J. Chouinard, ex-president, Better Home Heating, "The coal merchants job has just begun when he delivers coal. Coal is only as satisfactory as the equipment in which it is used. Only when the user receives complete satisfaction; only when the furnace is clean and tight and properly inspected; only when the coal is properly burned, is the sale completely satisfactory."

As the leaders in Better Home Heating dug into things they found: (1) that comparatively few users know how to operate their heating plant properly, (2) that many heating plants leave much to be desired in design, installation, maintenance, (3) few coal dealers are in a position to offer users competent heating or engineering service.

At one of the first meetings of the engineering committee, ways and means were discussed whereby users might be assured of getting a thorough furnace cleaning job and honest repairs. Specifications were prepared for a furnace cleaning job that would be satisfactory. The next step was to enlist the services of reliable heating firms to offer this furnace conditioning plan. It was known that many furnace cleaning offers were only a racket at cut rates which required repairs to show any profit.

The furnace dealers called in were asked to submit a schedule of reasonable charges for such a service at a price which would be fair and profitable to themselves. Legal counsel drew up a contract wherein the furnace dealer acted as the agent for members of Better Home Heating and agreed to follow the specifications for furnace cleaning. These furnace dealers also posted a performance bond for the customers' protection. For the further protection of the customer, the contract stipulated that any recommendation for unnecessary work would automatically void the contract and that all members of BHH would be advised of such cancellation immediately.

The result has been a degree of satisfaction never experienced by Twin Cities coal users before and such widespread publicity that Better Home Heating has been endorsed by several nation-wide organizations

and adopted by an increasing number of communities.

The specifications for furnace conditioning and the charges for service are shown. It will be noted that the charge for such an extensive service is most reasonable, but more important, this specification insures a cleaning job which really conditions.

The contract entered into by the coal supplier member of Better Home Heating and the furnace dealer doing cleaning is reproduced because there seems to be in this contract one excellent method for eliminating "gip" cleaning offers and obtaining the type of cleaning service every honest furnace dealer wants in his community.

This arrangement between coal suppliers and furnace dealers is implemented by an advertising program conducted by Better Home Heating. Newspapers were used over a period of months. In addition, a direct mail campaign to fuel dealers' customers' lists was carried along during the heating season and throughout the summer stressing the need for getting the furnace in proper condition in the off-heating season and getting coal into the bins before winter.

In addition, a heating course was offered in order that men who sell coal should first know how coal should be selected, how fired, and how to judge the condition of the heating plant.

BETTER HOME HEATING, INC.
FURNACE CONDITIONING AGREEMENT

THIS AGREEMENT, executed this ..... day of ....., 194.., between BETTER HOME HEATING, INC., hereafter referred to as "Agent", and ....., hereafter referred to as "The Company", WITNESSETH:

1. Agent acts herein as agent for its stockholder-members, who are wholesale and retail dealers in solid fuel in Minneapolis and Saint Paul, Minnesota. Said dealers desire to enter into arrangements with various reputable firms in the business of furnace cleaning and repair whom they can recommend to their customers or engage on behalf of their customers. The furnace cleaning and repair firms, including the undersigned Company, desire to enter into such an arrangement so that the fuel companies will recommend them to homeowners for furnace cleaning and repair work. The Company understands that one purpose of this contract is to insure that unnecessary repairs or alterations will not be recommended to homeowners and that other high standards of business ethics will be followed, and the Company agrees to abide by such standards.

2. Agent agrees on behalf of itself and its stockholder-members that it and its stockholder-members will, whenever inquiries are made of them, for cleaning or repair work or any work involving heating plants in general, including hot-water systems, steam systems, furnaces, etc., recommend, or place such work with, only the undersigned Company or one of the other companies with whom an agreement similar to this is in force, and no one else.

3. Agent and its stockholder-members will aggressively promote the purchase of furnace cleaning and repairing services by their customers, through advertising of agent and of the individual stockholder-members, and through other means.

4. Whenever Agent or any of its stockholder-members places an order with The Company for work, it will do so in writing, or will confirm the order in writing stating the work desired, the price, and any other necessary information.

5. The Company agrees to do all cleaning work according to specifications furnished it by the Agent. Present specifications for various types of heating plants are attached hereto and become a part of this agreement. The Agent may, from time to time, alter or amend these specifications giving due notice to The Company so that price schedules may be changed in accordance with the altered specifications.

6. The Company agrees that it will furnish to Agent, and to any one or all of its stockholder-members, as may be designated from time to time to The Company by Agent in writing, a schedule or schedules of prices and charges which it charges for the doing of any cleaning or repair work. It may from time to time at its convenience, alter, appoint or amend such schedules, informing the persons designated as above stated of those changes. But in any event it shall not charge any customer or Agent, or of any of its stockholder-members, more than the charge prescribed for such work in its schedules then on file with those designated persons.

7. Within ten (10) days after the employee or representative of The Company has called upon the customer pursuant to order or recommendation of Agent or a stockholder-member, or performed any part of the work for the customer, The Company will furnish the stockholder-member who has ordered the work, a statement showing:

(a) The name and address of the customer.
(b) The work originally ordered and the price therefor.
(c) The work done and the price charged therefor.
(d) The repairs or additional work done, if any, or recommended to the customer by The Company, or its representative or employee, and the price charged or quoted to the customer therefor.

8. Before any work is done by The Company for a customer pursuant to this agreement, The Company will furnish to Agent satisfactory proof that it has outstanding a policy or policies of public liability insurance with limits of $10,000.00, or higher,

(*Continued on page* 108)

. . . PUT YOUR FURNACE IN FIGHTING TRIM
Your furnace has a war job—protecting your health and maintaining your heating comfort.
If clogged by soot or in need of repair it cannot be expected to give efficient heating results and yield full value for your heating dollar. For dependable service on your heating plant, ask your Better Home Heating merchant about our Furnace Conditioning Plan.
Your furnace will be cleaned and checked over thoroughly by people whom you can trust and who know their business. Have this work done *now.*
For full details, call your Better Home Heating merchant listed on page 57, yellow section of the new telephone directory.
BETTER HOME HEATING, INC.
A NON-PROFIT ORGANIZATION

A FIRST-CLASS JOB ASSURES GREATER HEATING SATISFACTION
Each of the 21 steps in our furnace conditioning service is essential for a first-class job. To do less is not enough, and to do more is unnecessary.
We offer this furnace conditioning service because we want you to enjoy the utmost in heating comfort and satisfaction, at the least possible cost. Your heating plant will have a big task next winter — put it in proper working order now so that it may serve you faithfully and well.
DEALER IMPRINT
HAVE YOU HEARD ABOUT 21-POINT FURNACE CONDITIONING?
An Honest, Dependable Furnace Service
Now you can be sure of getting a thorough job of furnace cleaning, at a fair price.
The furnace conditioning plan developed by Better Home Heating, Inc., of which we are a member, follows rigid specifications. The heating firms we recommend for this work are reliable, and have posted a performance bond for your protection.

Inside pages (reduced size) of the "Specifications For Furnace Conditioning" shown on facing page. This is a mailing piece sent to fuel and heating dealers' mailing lists. Below is a 2-column, 6-inch newspaper advertisement, run in several Minneapolis papers, during the summer. Several types and sizes of ads were used.

Stoker Service Refinements Which Improve Operation* [Part I]

By Walter Knox†

SINCE the service man is often called upon to service or regulate many different makes of stokers and since some of these may be of an old type lacking the refinements of the newer designs, it is felt that it would be helpful to have an outline of the fundamental principles of design and operation that are common to all the domestic underfeed stokers built for bituminous coal.

The following then is a summary of what might be found in the various stoker manufacturers' operating manuals and is an outline of the generally accepted basic points of design, installation, and operation of the bituminous underfeed stoker.

The first thing is a barometric damper. Do not fail to recommend one. An automatic damper is a fuel saver, it promotes a more uniform depth of fuel bed, and all the evidence shows it tends to help in stubborn cases of fires going out. There should be one on every job. Set it so the overfire draft is three or four hundredths of an inch when the stoker is running.

Section I—Conveying Coal

If a stoker is correctly designed, it takes very little power to worm in the coal. On the ordinary single dwelling size machine it should be possible to fairly easily turn the worm under burning conditions with a wrench having a one-foot handle. A bin feed type will turn slightly harder than a hopper model.

If the design is correct the above load will be practically all in two places: First, where the coal breaks from the hopper or bin into the coal tube (at the spike trap); and second, where the coal pushes up the retort into the fuel bed. A correct design will have the coal moving so loosely through the coal tube that very little power is used to move the coal in the tube.

Breaking the Coal Into the Coal Tube

A feed worm in a hopper or a bin will ordinarily bring up more coal than can be carried away in the coal tube; that is, if more than, let us say 15 inches of length is exposed to the coal. Unless something is done to correct this, result will be crushing of coal and consumption of power. Evidence of this crushing is often seen in the fact that pulverized coal is pushed up above the entrance of the coal tube.

Especially in a bin feed where there is ordinarily a long screw exposure in the coal, some remedy is necessary.

There are a variety of steps taken by manufacturers to correct this condition. One common method is to taper the exposed feed screw in the hopper or bin, diminishing the diameter progressively away from the coal tube entrance. Sometimes the screw diameter is cut down in one step in which case a few inches of full diameter screw will be left exposed out from the spike trap. All of the rest of the exposed screw will be of a much smaller diameter.

Another method used in controlling the volume of coal brought to the coal tube is to cover part of the screw. Ordinarily a hopper has a formed or cast base to fit the diameter of the feed screw; see Figure A. This means that from ⅔ to ¾ of the diameter of the screw is exposed to the coal. Sometimes more of the diameter of the screw is covered in order to decrease the flow of coal; see Fig. B. Oftentimes a smart service man will put in a plate to partially cover the screw; see Figure C.

However, this method is not as effective as cutting a taper, and it is not uncommon for a service man to cut a decided taper on a feed screw that is bringing too much coal up to the coal tube.

Fig. A

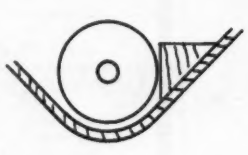


Fig. B

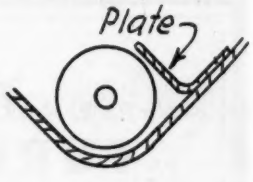


Fig. C

Spike Trap

The spike trap is fundamentally a device for catching foreign material and for providing a method of removing the same. However, many manufacturers make the spike trap perform another equally important function, namely to "meter," or limit, the amount of fuel going into the coal tube. Since the spike trap must of necessity be at the entrance of the coal tube it generally forms part of this entrance; see II in Fig. D. The trap can then be so formed and placed that it restricts the flow of coal. In other words, the cross-section under the spike trap can be made smaller than any of the rest of the coal tube. The coal then may be packed fairly tight as it passes under the trap, but as it goes into the rest of the tube it will loosen up because of the greater area.

*Address before Virginia Retail Coal Merchants Meeting.
†Formerly, The Koppers Coal Co., presently, H. D. Conkey Co.

The spike trap generally is on top of the coal tube. There is a mistaken idea among many service men that raising this spike trap (possibly putting extra gaskets under it) results in lessening the packing and crushing of coal. This is fundamentally wrong. You *cannot* put coal into the large end of a funnel and take it out of the small end very successfully. You must put it in the small end and take it out the large end. *In the case of packing and crushing of coal in the tube the wise service man will lower the spike trap, putting it down as close to the coal screw as possible without actually rubbing.*

Variable Pitch Screws

Under some conditions it is found that restricting the flow of coal at the spike trap is insufficient to entirely eliminate packing of coal in the tube. Therefore, other supplementary methods are often used.

One method is to progressively increase the diameter of the coal tube from the spike trap to the retort. This is satisfactory for the hopper models and can be easily done with cast materials. However, with the longer bin feeds and where stock steel tubing is used, a variable pitch feed screw more easily serves the purpose.

A variable pitch screw is simply one that does not have a constant pitch (distance between flights) along its length. Common practice is to use a short distance between flights in the hopper or bin and a short way into the coal tube. Then the rest of the feed screw in the coal tube will be given a greater distance between the flights. By this method the amount of coal fed into the coal tube is cut down and after the coal has passed the entrance it is loosened up as it gets to that part of the worm of greater pitch.

Retort

If the coal is carried loose there will be no appreciable load in the coal tube but when it reaches the retort it must be pushed up. The slope and general shape of the retort have a great deal to do with the ease with which this is accomplished. It is sufficient to say that the cross-section area must be of constantly increasing dimensions. About all a service man can do in this connection is to be sure there are no clinkers sticking to the inside of the retort.

In the case of the smaller domestic retorts the feed screw will end about at the entrance into the retort. With the longer retorts of the larger machines the screw will protrude some distance into the retort. In the larger machines the exact position of end of the screw in the retort must be governed by its influence on distribution and segregation of the coal as well as the power used. As a rule the feed screw will protrude into the retort a distance equal to approximately one-third of the length of the inside of the retort.

Summary

The accepted good design in conveying coal is to use a taper, or smaller diameter, or some other method of reducing crushing in the hopper or bin; reduce the cross-section area at the spike trap (entrance to coal tube) in order to "meter" the coal; use a constantly enlarging coal tube, or use a variable pitch screw to loosen the coal in the tube; keep the retort free of obstructions.

In case of crushing of coal or excessive power requirements the service man should see that the above requirements are met by some manner. Also a good service man will make sure that there is good alignment of the various parts of the tube as an offset of as little as 1/16th of an inch between different sections will often cause a pack and consequent crushing of coal.

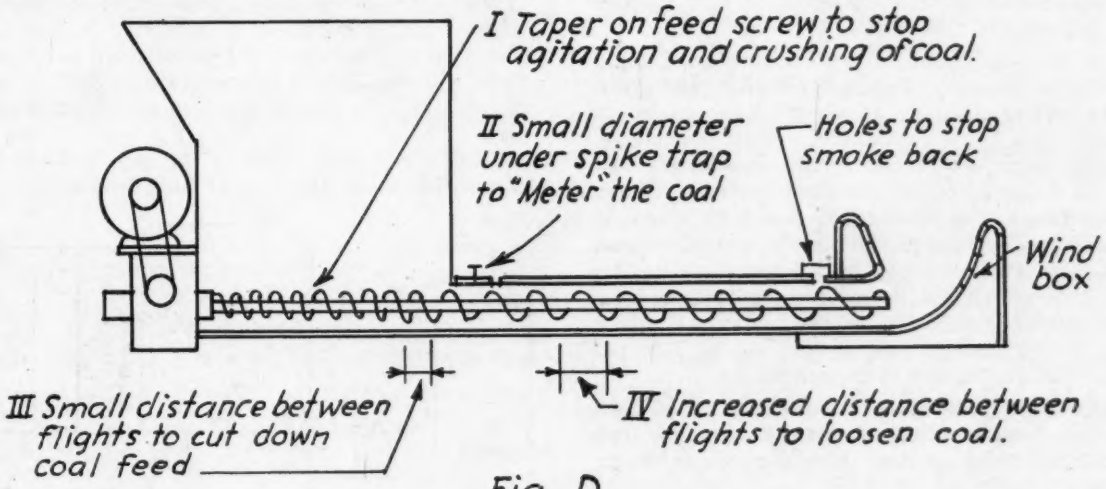

I Taper on feed screw to stop agitation and crushing of coal.
II Small diameter under spike trap to "Meter" the coal
Holes to stop smoke back
Wind box
III Small distance between flights to cut down coal feed
IV Increased distance between flights to loosen coal.

Fig. D

Method of Design to Control Smoke Back

The tendency for smoke and coal gas to come back through the coal tube and into the hopper is partially dependent upon the type of coal. Low volatile, properly sized, oil treated coals seldom give trouble in this connection. Poorly sized and dusty coals are often bad offenders. Also there are coals with ash characteristics such that the best of stoker designs will not stop "smoke back."

Since this gas comes back through the coal tube the most obvious and the most generally used method of lessening the tendency is to put an air pressure inside the coal tube. Small holes or slots are cut in the top of the coal tube generally within a few inches of the retort. In some designs, air is brought to these holes by a separate pipe, or conduit. In this case air is sometimes brought directly from the fan outlet in an attempt to get a maximum pressure. In some designs there is no separate pipe to the holes since the holes are in that portion of the coal tube which is inside of the windbox (air chamber) surrounding the retort. Therefore, the holes are subject to the air pressure within the windbox.

If the holes are small enough and correctly placed

(*Continued on page* 90)

Fuel Saving Secured by Closing Off Rooms

By E. F. Fuller

AT THE present time the United States Government, the petroleum industry, oil burner dealers, heating contractors, insulation dealers, and almost every owner of buildings that require heat, are trying to find ways and means to save fuel.

It is claimed that shutting off rooms will save fuel, and reduce fuel bills; however, an accurate method of calculating this savings is still more or less controversial and the conflicting examples of fuel savings tend to confuse the thinking.

Here is a typical example of fuel saving: During the months of January, February, March, and April 1941, the writer lived in an eleven room house in Wisconsin. This house contained a forced circulating, oil burning, warm air furnace, with a maximum heat delivery at the grills of 100,000 Btu's per hour. When the entire house was heated, the fuel bills averaged fourteen dollars per month, during the heating season. For the period of four months I lived alone in this house, I shut off all but three of the rooms, and my fuel bills averaged only five dollars per month, which shows a saving of 500 gallons fuel oil, at 7.3c per gallon, or $36.50 for the four months.

When it becomes necessary or desirable to shut off one or more rooms to save fuel, one cannot simply turn off the radiator valve, or close the shutter on the warm air registers, walk out, shut the door, and expect to get full benefit of the fuel saved by closing up the room or rooms.

How To Calculate Savings

The purpose of this article is to explain one method of calculating fuel savings by shutting off rooms during the heating season. Effective methods of closing off the delivery of heat to shut up rooms, may be presented in future articles.

In a building of 100,000 Btu's Maximum Heat Demand; 7200 Degree Days to heat, 80 per cent over all efficiency of heating plant; 2100 gallons fuel oil consumed per heating season at 7.3c per gallon, or a total cost of $153.30, should it be decided to shut off one room of 10,000 Btu's., M.H.D., we could not expect to save 210 gallons of fuel oil, or 10 per cent of the total amount of fuel consumed to heat the entire building for a normal heating season.

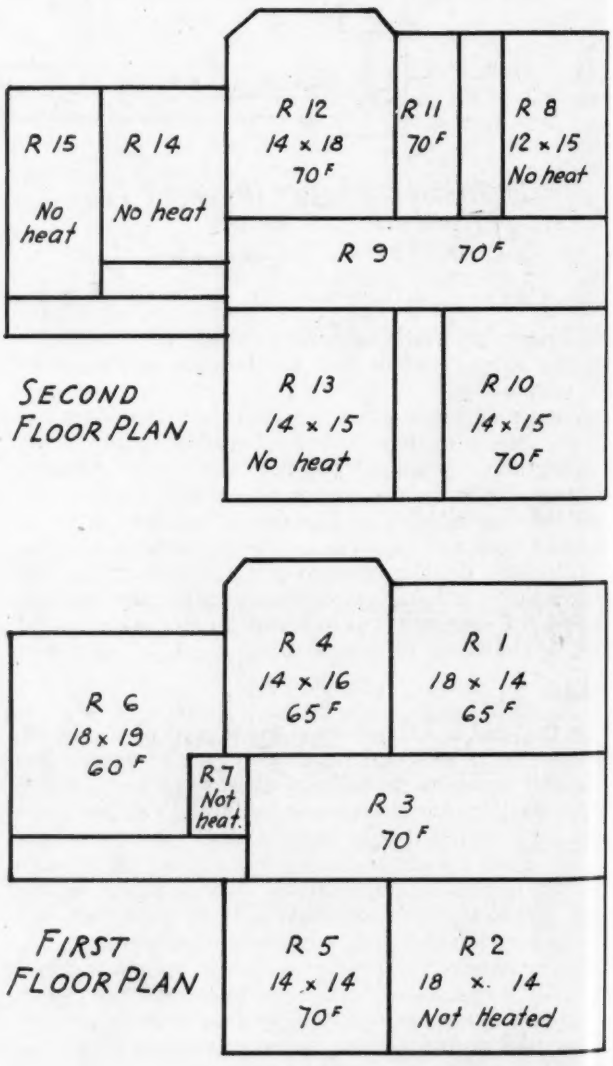
Perhaps the best method of illustrating an accurate calculation, is to present data taken from a survey made by the E. F. Fuller Engineering Company, in the City of Oconomowoc, Wisconsin.

The building is a fifteen room residence. Six of the rooms were shut off entirely, and part of the nine rooms that were heated, maintained a temperature of less than 70F.

The heat is supplied by a central, warm air, gravity circulating furnace of 100,000 Btu's per hour maximum heating capacity, and a conversion oil burner. When this heating plant was installed, the owner had no intention of heating the entire house so some of the rooms were not supplied with warm air registers. As the building was originally constructed, the maximum heat loss was 188,000 Btu's which would have required a heating plant twice the size of the one installed and to heat the whole house would have taken 4,803 gals. of oil at 7.7c or a cost of $369.83.

Where inside walls of unheated rooms adjoin the walls of heated rooms, it is calculated in this illustration, that the filtration of heat through the floors and walls will maintain a temperature of 32F in shut off rooms, when the outside temperature is fourteen below zero.

(Editor's Note: Table 1 in the Technical Code shows that when the rate of heat transmission for a



Basis of Calculation

70F. inside temperature. —14F. outside. Temperature difference 84F.
65F. inside temperature. —14F. outside. Temperature difference 79F.
60F. inside temperature. —14F. outside. Temperature difference 74F.

Coefficients of Transmission

Glass

Windows—

Double Hung (Single)	(Storm Sash)
70F. — 1.13 x 84 = 95	.75 x 84 = 63
65F. — 1.13 x 79 = 89	.75 x 79 = 60
60F. — 1.13 x 74 = 75	.75 x 74 = 56

NOTE: Figure doors same as glass.

Walls

Composition, clap boards, building paper, 1 inch sheathing, studding, wood lath and plaster. (Factor .25.)

	Ceiling
70F. — .25 x 84 = 21	4 inches rock wool
65F. — .25 x 79 = 20	.065 x 84 = 6
60F. — .25 x 74 = 18	

Infiltration

Average cu. ft. of air per foot of crack equals 34.1 (.018 = Infiltration per cu. ft.)

84 × .018 = 1.5 x 34.1 = 51
79 × .018 = 1.42 x 34.1 = 47
74 × .018 = 1.33 x 34.1 = 44

Cold Inside Walls

Wood lath and plaster two sides, studding between. (Factor .34.)

70F. — .34 x 38 = 13	(70° — 32° = 38°)
65F. — .34 x 33 = 11	(65° — 32° = 33°)
60F. — .34 x 28 = 09	(60° — 32° = 28°)

partition is .4 Btu per hour per square foot of surface the air temperature in the unheated room is 22 degrees when the outside temperature is —10 degrees and the inside temperature in the heated room is 70 degrees. For partitions with a rate of heat transmission of .3 the temperature in the cold room is 16 degrees. This differs from Mr. Fuller's 32 degrees.)

As stated previously, the original heat loss was 188,000 Btu, but provision for heating was not included in some rooms. The nine rooms which were heated were maintained at 60, 65 and 70 degrees as shown in the Heat Loss Calculation Sheet above. But improvements to reduce heat loss and "winterize" the structure, for the entire house, (heated and unheated rooms) were made as follows:

	Btu's
(1) The addition of storm windows saving.	12,300
(2) The addition of storm sash, has also reduced the amount of cold filtering through cracks around windows, showing a saving of	10,200
(3) The ceilings of the second story rooms have been insulated with 4 inches R. W., saving	19,100

HEAT LOSS CALCULATION SHEET

Room 1	:Glass	84 x 60 = 5.0	
65F.	:Wall	236 x 20 = 4.7	
Liv. R.	:Inf.	65 x 51 = 3.3	13.0
Room 3	:Glass	32 x 63 = 2.0	
70F.	:Wall	68 x 21 = 1.5	
Hall	:Inf.	16 x 51 = .8	
	:Ins. W.	140 x 13 = 1.8	6.1
Room 4	:Glass	90 x 60 = 5.4	
65F.	:Wall	70 x 20 = 1.4	
Din. R.	:Cr.	69 x 47 = 3.2	10.0
Room 5	:Glass	42 x 63 = 2.7	
70F.	:Wall	243 x 21 = 5.1	
Bd. R.	:Inf.	40 x 51 = 2.0	
	:I. W.	140 x 13 = 1.8	11.6
Room 6	:Glass	84 x 56 = 4.7	
60F.	:Wall	466 x 18 = 8.4	
Kit.	:Inf.	85 x 44 = 3.7	
	:C.	234 x 8 = 1.9	18.7
Room 9	:Glass	24 x 63 = 1.5	
70F.	:Wall	56 x 21 = 1.2	
Hall	:I. W.	80 x 13 = 1.0	
	:Inf.	20 x 51 = 1.0	
	:Ceil.	256 x 6 = 1.5	
	:I. W.	200 x 13 = 2.6	8.8
Room 10	:Glass	48 x 63 = 3.0	
70F.	:Wall	213 x 21 = 4.5	
Bd. R.	:Inf.	40 x 51 = 2.0	
	:C	210 x 6 = 1.3	10.8
Room 11	:Glass	17 x 63 = 1.0	
70F.	:Wall	37 x 21 = .8	
Bd. R.	:C	72 x 6 = .5	
	:I. W.	135 x 13 = 1.8	
	:Inf.	17 x 51 = .9	5.0
Room 12	:Glass	54 x 63 = 3.5	
70F.	:Wall	170 x 21 = 3.6	
Bd. R.	:Inf.	51 x 51 = 2.6	
	:C.	266 x 6 = 1.6	
	:I. W.	170 x 13 = 2.2	13.0
Total			97.0 = 97,000 Btu's M.H.D.

(4) A saving has also been accomplished by reducing temperatures and not heating rooms as indicated in sketch herewith, saving 49,400

Total savings 91,000

During the winter of 1941-42, the oil burner in this residence consumed 2467 gallons fuel oil at 7.7c = $189.96, or the equivalent of 16 tons of coal at $12.00 or $192.00 to heat 97,000 Btu. loss.

The actual saving accomplished by reducing temperatures and shutting off the heat in indicated rooms in this house amounted to 49,400 Btu's, per hour, or the equivalent of 1250 gallons fuel oil at 7.7c = $96.25 during the entire winter of 1941-42.

The consumption in 1942-43 should have been greater, by 18% than in 1941-42, however in August 1942, a readjustment of the oil burner was made with scientific instruments, and the owner now reports that the 1942-43 fuel consumption was just about the same as in the previous year.

Two Speed Blower Control System

By Chas. H. Buck

THIS article is an explanation of the action and results obtained by the use of a controlling system for a two-speed blower, automatically and intermittently-fired heating system; the fire to be controlled by a room thermostat and the two-speed blower to be controlled by a combination of two bonnet thermostats (or one combination two-speed bonnet thermostat) and one special combustion temperature switch, (or one single-pole, double-throw relay with separate control circuit. This control circuit to be energized by the same current source as the oil burner or stoker motor or the gas valve as the case may be.) (This control cycle is patented by the writer.)

First let us examine the controls themselves. The two bonnet thermostats used in this system (with the exception of the wiring details) can be any make standard bonnet switches, preferrably a combination two-speed control; in addition to which we add a slip-action, stack or combustion temperature switch containing a switching action comparable to a single-pole double-throw relay switch. This stack or combustion switch may be mounted in the outlet of the heating unit, or at any place where the gases of combustion will contact the inserted element.

This switch is designed so that a rise in temperature of approximately fifty degrees will change the position of the switch from the cold contact to the running contact. As soon as this switching action is completed, the mechanism is so designed that while the switch remains in this running position, the operating mechanism will slip and continue to move with the increasing combustion gas temperature, continuing this movement until the combustion gases have reached their maximum temperature during the cycle of operation. After the combustion temperature reaches its maximum during any cycle, the switching mechanism ceases moving and the switch retains the running position, which it maintains as long as combustion continues.

When combustion ceases, the combustion gases or stack temperatures immediately begin to lower. The lowering of these gases 50 degrees from the high temperature attained during the cycle will actuate the switching mechanism and return the switch to the original starting contacts. After that the switching contacts will remain stationary, but the operating mechanism will continue to move as long as the temperature in the gas travel area continues to lower.

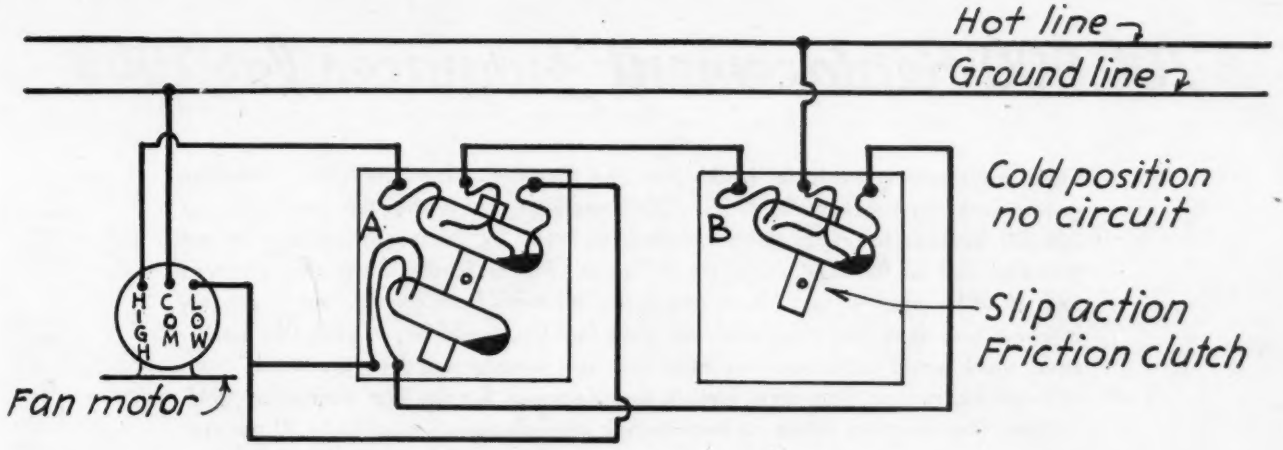
As a concrete example, let us assume the stack temperature before starting is 90 degrees and the maximum temperature attained during the operating cycle is 350 degrees; let us assume the stack switch contains two switches connected to three terminals, one common terminal and two independent terminals. Starting cold, the stack temperature is 90 degrees and one switch is in contact, connecting the common terminal with one of the independent terminals; the other switch is not in contact. Upon a rise in stack temperature from 90 degrees to approximately 140 degrees (an approximate rise of 50 degrees) the circuit made when starting is broken and the other circuit is made, thereby connecting the common terminal with the other independent terminal. The stack temperature continues to rise but other than the slipping of the operating mechanism, the switches retain the position as at approximately 140 degrees even though the combustion temperatures reach the 350 degree maximum in the cycle.

Upon lowering the temperature of the combustion gases from 350 degrees to approximately 300 degrees, the switches are actuated and returned to their original positions. At this point the switches again become inactive and the actuating mechanism begins to slip on a further lowering of temperature and continues to slip until a minimum temperature is reached.

The two bonnet controls or the combination two-speed bonnet control can be mounted *any place* in the bonnet of the heating system. Note there is *no experimenting* to find a proper location, any location in the bonnet in the flow of the circulating air is satisfactory. The low speed thermostat we will set to cut in at 125 degrees F and cut out at 100 degrees F. The high speed thermostat we will set to cut in at 150 degrees F and cut out at 125 degrees F. The stack or combustion temperature slip action thermostat we will mount in the flue gas outlet or stack. This thermostat needs no adjusting as the adjustment is automatically taken care of by the slip action.

Now let us follow the action and results of this system through a complete cycle. The room thermostat calls for heat and starts the fire. Upon an approximate rise of 50 degrees in the flue gas temperature (usually requiring about one minute) the stack switch will start the blower on low speed. This action will not take place unless the fire is definitely established, in other words, no false starts are made as would happen where this action is attempted with the use of time or motor controlled switches. This low speed blower start positively eliminates the tendency for the system to circulate by gravity during the heating up period and definitely establishes a balanced circulation throughout the system, evacuating all lines and maintaining a balanced circulation from the start throughout the entire cycle.

The only objection which has ever been raised is a question regarding the circulating of cold air. By carefully watching some 100 or more systems through an entire winter, I find that the air movement on low speed (providing that the slow speed is approximately ½ the speed of the high or design speed of the blower, except on systems with considerable resistance in which case the low speed may be increased) even though at no increase in temperature above the return air temperature, does not create an uncomfortable condition, because the small volume and slow velocity is not detectable by the human body. Circulation has been definitely established, but the cool air in all warm air pipes has been evacuated so slowly that no drafty condition is noticed. The blower continues to operate on low speed during the heating up period and until the bonnet temperature has increased sufficiently to actuate the bonnet high speed thermostat. Note that at this point the bonnet temperature has increased to and above the cut-in point of the low speed bonnet



A - Two speed bonnet control.

B - Stack or combustion temperature actuated (sing le pole double throw slip action) control

or

B - Single pole double throw switch relay. Oil burner motor or gas valve or stoker circuit operated.

thermostat and, due to the fact that the blower was already operating on low speed, this low speed bonnet thermostat performs no function at this time.

During this time the heating system has maintained balance and every room has received warm air in quantities to maintain this balance according to the design of the system. When the bonnet temperature has increased sufficiently to actuate the high speed bonnet thermostat, the blower is automatically changed from low to high speed. By this time the bonnet temperature, and the register air temperature, have increased sufficiently so that the increased volume and velocity of the air still does not create a drafty or uncomfortable condition. From this point in the cycle and as long as the room thermostat maintains the fire, the blower or fan will continue to operate on this higher speed, still maintaining a comfortable balanced condition.

When the room thermostat becomes satisfied and stops the fire, the stack gas temperature immediately begins to decrease. As soon as the stack gas temperature (which we assumed would reach 350 degrees maximum) has decreased to approximately 300 degrees, or an approximate decrease of 50 degrees (usually requiring about one minute), the actuating of the stack thermostat immediately returns the blower or fan to low speed, even though the bonnet thermostat is still calling for high speed. This action reduces the volume and velocity of the circulating air to the original volume and velocity as furnished with low speed operations. This volume is so small that the possibility of an over run of the room air temperature is entirely eliminated. No drafty condition is or has been apparent during the cycle because the air temperature has been better balanced with the air volume and velocity. No under-run of room temperature at the beginning of the cycle is noticed because air circulation was definitely established immediately after the thermostat called for heat and started the fire. No over-run of room temperature was noticed at the time the thermostat stopped the fire because the blower was immediately returned to low speed which did not furnish a volume of air which would continue to raise the room air temperature. After the room thermostat has stopped the fire and the stack thermostat has returned the blower or fan to low speed, the blower or fan will continue to operate on low speed until all the built up heat in the bonnet of the furnace has been dissipated. This requires quite some time and this built-up heat is distributed evenly during the off-period of the fire, according to the design of the system.

With the system as explained, with return to low speed by approximately 50 degrees decrease in stack temperature, the low speed operation is comparably long and in cold weather a new start may be made before the blower is stopped by the low speed bonnet thermostat, due to a decrease to 100 degrees in the bonnet air temperature.

On systems where the starting load of the oil burner or stoker motor and the blower motor, thrown on the line at the same time, is not objectionable, it is advisable to use the relay switch mentioned instead of the combustion control as explained. This will not change the results obtained by this control cycle, but will eliminate a possible source of service (that of cleaning the actuating element of the combustion control occasionally).

This system, when used with a two-speed blower or fan circulating heating system, eliminates the drafty condition frequently found in blower or fan systems; eliminates air stratification due to the continual stopping and starting of the blower or fan; eliminates under-run of room air temperature, due to the fact that air circulation is immediately established when needed; eliminates over-run of room air temperature because the blower or fan is returned to low speed when the room thermostat is satisfied.

This system further permits the balancing of the system to such an extent that all rooms are heated evenly and within a satisfactory differential. This is due to the fact that the quick start on a rise in combustion gas temperature eliminates the possibility of gravity circulation in part of the system and an unbalanced condition throughout, prior to start of the blower or fan by immediately starting the blower or fan on low speed after the fire is established.

200,000 Replacement Furnaces for 1944.

From investigations made in Washington last October, American Artisan reported government agencies (WPB, OCR, OPA) expected to secure the production of 200,000 furnaces for replacement purposes in 1944. By January it became evident that cast iron for furnaces was so much "easier" that most restrictions were removed and, as of February 1, cast iron is completely removed from control. But in January it was also evident that manpower and plant facilities would be, in 1944, the bottlenecks which would determine how many cast iron furnaces could be produced. Now, in February, reports from steel furnace manufacturers for the first quarter of 1944, indicate that many are being cut back in their steel allocations from 15 to 30 per cent below the tonnages assigned for the first quarter of 1943. This means decreased steel furnace production. And manpower and facility problems are as acute among the steel furnace producers as among the cast iron foundries. So, 200,000 replacement furnaces for 1944 still looks like a good base from which to plan how many replacements each contractor can hope to make in 1944. In the November, December and January issues, American Artisan presented tabulations showing how many replacement furnaces each county might expect if we produce 200,000 furnaces. The state and county tabulations following complete the suggested quotas.

Furnaces Installed by States and Counties and Replacement Furnaces Available in 1944

(Area 3) (On Basis of 200,000 Production)

ALABAMA

No. 1	Total Furnaces Installed	20,381
No. 2	% of National Total	.29%
No. 3	Allotment of 200,000 Quota	580

Counties	No. 4 Total Furnaces Installed	No. 5 % of State Total	No. 6 Allotment of State Quota (No. Furnaces)
Autauga	10	.05	....
Baldwin	57	.28	2
Barbour	9	.05	....
Bibb	11	.05	....
Blount	319	1.57	9
Bullock	7	.03	....
Butler	9	.05	....
Calhoun	590	2.90	17
Chambers	61	.30	2
Cherokee	14	.07	....
Chilton	19	.09	1
Choctaw	....	....	....
Clarke	19	.09	1
Clay	6	.03	....
Cleburne	10	.05	....
Coffee	3	.01	....
Colbert	530	2.60	15
Conecuh	2	.01	....
Coosa	4	.02	....
Covington	25	.12	1
Crenshaw	2	.01	....
Cullman	132	.65	4
Dale	6	.03	....
Dallas	162	.79	5
De Kalb	280	1.37	8
Elmore	19	.09	1
Escambia	23	.11	1
Etowah	607	2.98	17
Fayette	11	.05	....
Franklin	29	.14	1
Geneva	4	.02	....
Greene	31	.15	1
Hale	15	.07	....
Henry	1	....	....
Houston	30	.15	1
Jackson	273	1.34	8
Jefferson	13,006	63.82	370
Lamar	18	.09	1
Lauderdale	466	2.29	13
Lawrence	21	.10	1
Lee	245	1.20	7
Limestone	44	.22	1
Lowndes	7	.03	....
Macon	8	.04	....
Madison	319	1.57	9
Marengo	18	.09	1
Marion	12	.06	....
Marshall	67	.33	2
Mobile	657	3.22	19
Monroe	2	.01	....
Montgomery	693	3.40	20
Morgan	293	1.44	8
Perry	20	.10	1
Pickens	10	.05	....
Pike	10	.05	....
Randolph	22	.11	1
Russell	13	.06	....
St. Clair	22	.11	1
Shelby	72	.35	2
Sumter	15	.07	....
Talladega	93	.46	3
Tallapoosa	37	.18	1
Tuscaloosa	715	3.51	21
Walker	82	.40	2
Washington	5	.02	....
Wilcox	9	.05	....
Winston	50	.25	1

SOUTH CAROLINA

No. 1	Total Furnaces Installed	7,483
No. 2	% of National Total	.11%
No. 3	Allotment of 200,000 Quota	220

Counties	No. 4 Total Furnaces Installed	No. 5 % of State Total	No. 6 Allotment of State Quota (No. Furnaces)
Abbeville	10	.13	....
Aiken	84	1.12	3
Allendale	7	.09	....
Anderson	139	1.86	4
Bamberg	14	.19	....
Barnwell	14	.19	....
Beaufort	33	.44	1
Berkeley	18	.24	1
Calhoun	10	.13	....
Charleston	298	3.98	9
Cherokee	101	1.35	3
Chester	66	.88	2
Chesterfield	30	.40	1
Clarendon	14	.19	....
Colleton	23	.31	1
Darlington	138	1.85	4
Dillon	23	.31	1
Dorchester	8	.11	....
Edgefield	17	.23	1
Fairfield	74	.99	2
Florence	101	1.35	3
Georgetown	41	.55	1
Greenville	2,246	30.02	66
Greenwood	55	.74	2
Hampton	4	.05	....
Horry	44	.59	1
Jasper	3	.04	....
Kershaw	14	.19	....
Lancaster	60	.80	2
Laurens	146	1.95	4
Lee	10	.13	....
Lexington	33	.44	1
McCormick	1	.01	....
Marion	36	.48	1
Marlboro	11	.15	....
Newberry	31	.41	1
Oconee	40	.53	1
Orangeburg	90	1.20	3
Pickens	159	2.12	5
Richland	1,691	22.60	50
Saluda	4	.05	....
Spartanburg	826	11.04	25
Sumter	121	1.62	3
Union	27	.36	1
Williamsburg	29	.39	1
York	539	7.20	16

ARKANSAS

No. 1	Total Furnaces Installed	5,391
No. 2	% of National Total	.08%
No. 3	Allotment of 200,000 Quota	160

Counties	No. 4 Total Furnaces Installed	No. 5 % of State Total	No. 6 Allotment of State Quota (No. Furnaces)
Arkansas	49	.91	2
Ashley	13	.24	....
Baxter	19	.35	1
Benton	290	5.38	9
Boone	187	3.47	6
Bradley	5	.09	....
Calhoun	3	.06	....
Carroll	67	1.24	2
Chicot	28	.52	1
Clark	13	.24	....
Clay	35	.65	1
Cleburne	9	.17	....
Cleveland	1	.02	....
Columbia	18	.33	1
Conway	19	.35	1
Craighead	286	5.31	9
Crawford	24	.45	1
Crittenden	123	2.28	4
Cross	41	.76	1
Dallas	6	.11	....
Desha	18	.33	1
Drew	24	.45	1
Faulkner	19	.35	1
Franklin	11	.20	....
Fulton	12	.22	....
Garland	31	.58	1
Grant	9	.17	....
Greene	85	1.57	3
Hempstead	28	.52	1
Hot Spring	2	.04	....
Howard	6	.11	....
Independence	39	.72	1
Izard	3	.06	....
Jackson	16	.30	1
Jefferson	71	1.31	2
Johnson	11	.20	....
Lafayette	....	....	....
Lawrence	13	.24	....
Lee	33	.61	1
Lincoln	6	.11	....
Little River	....	....	....
Logon	35	.65	1
Lonoke	31	.58	1
Madison	3	.06	....
Marion	2	.04	....
Miller	15	.28	....
Mississippi	72	1.34	2
Monroe	62	1.15	2
Montgomery	3	.06	....
Nevada	110	2.04	3
Newton	1	.02	....
Quachita	18	.33	1
Perry	7	.13	....
Phillips	228	4.23	7
Pike	3	.06	....
Poinsett	47	.87	1
Polk	7	.13	....
Pope	14	.26	....
Prairie	16	.30	1
Pulaske	1,449	26.87	43
Randolph	14	.26	....
St. Francis	90	1.67	3
Saline	6	.11	....
Scott	7	.13	....
Searcy	3	.06	....
Sebastian	499	9.25	15
Sevier	11	.20	....
Sharp	7	.13	....
Stone	....	....	....
Union	48	.89	2
Van Buren	6	.11	....
Washington	788	14.62	23
White	75	1.39	2
Woodruff	36	.67	1
Yell	5	.09	....

FLORIDA

No. 1	Total Furnaces Installed	9,523
No. 2	% of National Total	.14%
No. 3	Allotment of 200,000 Quota	280

Counties	No. 4 Total Furnaces Installed	No. 5 % of State Total	No. 6 Allotment of State Quota (No. Furnaces)
Alachua	159	1.67	5
Baker	....	....	....
Bay	13	.14	....
Bradford	3	.03	....
Brevard	40	.42	1
Broward	7	.07	....
Calhoun	1	.01	....
Charlotte	....	....	....
Citrus	....	....	....
Clay	6	.06	....
Collier	....	....	....
Columbia	42	.44	1
Dade	48	.51	1
De Soto	3	.03	....
Dixie	....	....	....
Duval	1,656	17.39	49
Escambia	555	5.83	16
Flagler	6	.06	....
Franklin	1	.01	....
Gadsden	26	.27	1
Gilchrist	3	.03	....
Glades	....	....	....
Gulf	7	.07	....
Hamilton	....	....	....
Hardee	8	.09	....
Hendry	....	....	....
Hernando	1	.01	....
Highlands	6	.06	....
Hillsborough	636	6.68	19
Holmes	1	.01	....
Indian River	7	.07	....
Jackson	26	.27	1
Jefferson	17	.18	1
Lafayette	6	.06	....
Lake	247	2.59	7
Lee	16	.17	1
Leon	327	3.43	10
Levy	3	.03	....
Liberty	1	.01	....
Madison	14	.15	....
Manatee	141	1.48	4

FLORIDA (Cont'd)

Counties	No. 4 Total Furnaces Installed	No. 5 % of State Total	No. 6 Allotment of State Quota (No. Furnaces)
Marion	184	1.93	6
Martin	6	.06	....
Monroe	7	.07	....
Nassau	6	.06	....
Okaloosa	10	.12	....
Okeechobee	....	....	....
Orange	1,185	12.44	35
Osceola	3	.03	....
Palm Beach	48	.51	2
Pasco	10	.11	....
Pinellas	2,039	21.41	60
Polk	385	4.04	11
Putnam	61	.64	2
St. Johns	126	1.32	4
St. Lucie	2	.02	....
Santa Rosa	81	.85	2
Sarasota	40	.42	1
Seminole	89	.94	3
Sumter	17	.18	1
Suwannee	17	.18	1
Taylor	38	.40	1
Union	2	.02	....
Volusia	1,044	10.97	31
Wakulla	4	.04	....
Walton	29	.31	1
Washington	57	.60	2

NEW MEXICO

No. 1 Total Furnaces Installed 9,115
No. 2 % of National Total ..... .13%
No. 3 Allotment of 200,000 Quota 260

Counties	No. 4 Total Furnaces Installed	No. 5 % of State Total	No. 6 Allotment of State Quota (No. Furnaces)
Bernalillo	3,989	43.7	114
Catron	1	....	...
Chaves	486	5.33	14
Colfax	448	4.91	13
Curry	613	6.73	17
De Baca	25	.27	1
Dona Ana	302	3.31	9
Eddy	561	6.15	16
Grant	153	1.68	4
Guadalupe	36	.39	1
Harding	21	.23	1
Hidalgo	20	.21	1
Lea	25	.27	1
Lincoln	15	.16	...
Luna	246	2.70	7
McKinley	301	3.30	9
Mora	13	.14	...
Otero	48	.52	1
Quay	393	4.31	11
Rio Arriba	17	.18	...
Roosevelt	43	.47	1
Sandoval	62	.68	2
San Juan	155	1.70	4
San Miguel	284	3.11	8
Santa Fe	684	7.50	20
Sierra	4	....	...
Socorra	18	.19	1
Taos	22	.24	1
Torrance	14	.16	...
Union	76	.84	2
Valencia	40	.43	1

MISSISSIPPI

No. 1 Total Furnaces Installed 6,502
No. 2 % of National Total ..... .09%
No. 3 Allotment of 200,000 Quota 180

Counties	No. 4 Total Furnaces Installed	No. 5 % of State Total	No. 6 Allotment of State Quota (No. Furnaces)
Adams	94	1.45	3
Alcorn	60	.92	2
Amite	1	.01	....
Attala	5	.08	....
Benton	1	.02	....
Bolivar	108	1.66	3
Calhoun	13	.20	....
Carroll	....	....	....
Chickasaw	40	.61	1
Choctaw	3	.05	....
Claiborn	34	.52	1
Clarke	6	.09	....
Clay	7	.11	....
Coahoma	289	4.44	8
Copiah	20	.31	1
Covington	213	3.27	6
De Soto	24	.37	1
Forrest	44	.67	1
Franklin	1	.01	....
George	26	.40	1
Greene	2	.03	....
Grenada	33	.51	1
Hancock	32	.49	1
Harrison	153	2.35	4
Hinds	702	10.80	19
Holmes	16	.24	....
Humphreys	27	.41	1
Issaquena	1	.02	....
Itawamba	1	.01	....
Jackson	18	.27	1
Jasper	4	.06	....
Jefferson	4	.06	....
Jefferson-Davis	327	5.03	9
Jones	786	12.09	22
Kemper	1	.02	....
Lafayette	48	.74	2
Lamar	2	.03	....
Lauderdale	251	3.86	7
Lawrence	1	.02	....
Leake	3	.05	....
Lee	76	1.17	2
LeFlore	210	3.23	6
Lincoln	248	3.81	7
Lowndes	133	2.05	4
Madison	16	.25	1
Marion	338	5.20	9
Marshall	383	5.89	11
Monroe	78	1.20	2
Montgomery	1	.02	....
Neshoba	11	.17	....
Newton	16	.25	1
Noxubee	6	.09	....
Oktibbeha	218	3.35	6
Panola	17	.26	1
Pearl River	7	.11	....
Perry	....	....	....
Pike	63	.97	2
Pontotoc	319	4.91	9
Prentiss	9	.14	....
Quitman	5	.08	....
Rankin	38	.58	1
Scott	5	.08	....
Sharkey	9	.14	....
Simpson	6	.09	....
Smith	187	2.88	5
Stone	6	.09	....
Sun Flower	29	.45	1
Tallahatchie	18	.28	1
Tate	7	.11	....
Tippah	13	.20	....
Tishomingo	6	.09	....
Tunica	24	.37	1
Union	21	.32	1
Walthall	4	.06	....
Warren	87	1.34	2
Washington	184	2.83	5
Wayne	7	.11	....
Webster	6	.09	....
Wilkinson	32	.49	1
Winston	149	2.29	3
Yalobuska	18	.28	1
Yazoo	91	1.40	2

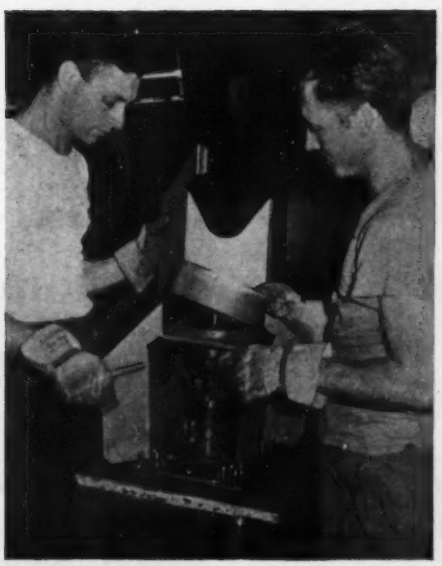
LOUISIANA

No. 1 Total Furnaces Installed 7,880
No. 2 % of National Total ..... .11%
No. 3 Allotment of 200,000 Quota 220

Counties	No. 4 Total Furnaces Installed	No. 5 % of State Total	No. 6 Allotment of State Quota (No. Furnaces)
Acadia	14	.18	....
Allen	9	.11	....
Ascension	6	.07	....
Assumption	2	.03	....
Avoyelles	22	.28	1
Beauregard	2	.03	....
Bienville	1	.01	....
Bossier	13	.16	....
Caddo	85	1.08	3
Calcasieu	111	1.41	3

(*Continued on page 89*)

SHEET METAL SECTION



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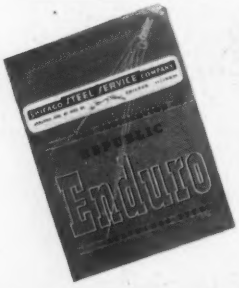

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Bomb Fins

A Study of a Production Procedure Which Completes Tens of Thousands of Fins and Crates Each Month

LONG before Pearl Harbor, New Monarch Machine and Stamping Company of Des Moines, Iowa, began production of war items for Navy, Ordnance and Army—the huge plant has been engaged almost 100 per cent in war work ever since. Many different items have been produced, but, in general, the company's principal facility—stamping of sheet metal—has been the governing factor on which selection of items has been made by the company production engineers.

Beginning in January, 1941, Monarch started production of bomb fins and bomb fin crates for 500 and 1000-pound aerial bombs. Being one of the first companies to engage in production of these items, there was little experience to guide production scheduling and no company experience which could be used directly except production of peace-time articles which, by some stretch of the imagination, could be considered comparable to fins and crates.

Because production was desired in terms of thousands of finished fins and crates *per day* the procedure and the tooling to be used had to be considered with great care and every step in the proposed scheduling devised and tested thoroughly so that when production got into full swing there would be no bottle necks and no delaying changes required. It required three months to get the correct procedure, tooling, fixtures, machine set-ups, personnel trained—all the thousand-and-one small details ironed out.

But when this three months experimental period was finished, Monarch was really ready—so ready that month after month since, bomb fins and bomb crates have rolled out of the plant by the tens of thousands.

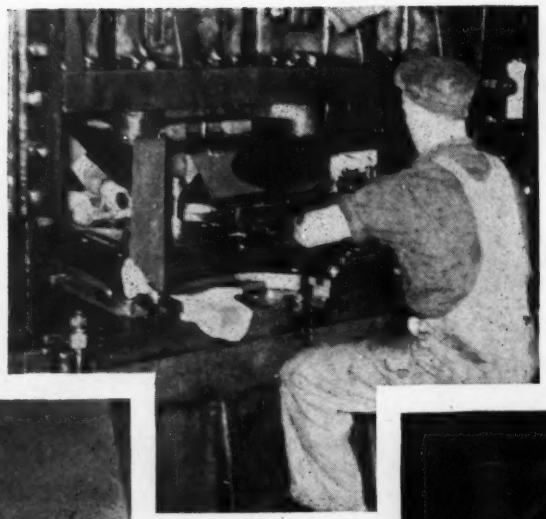
Monarch is convinced that with some help on manpower problems the production set-up to be described can turn out 3,000 fins and 3,000 crates *a day* if necessary.

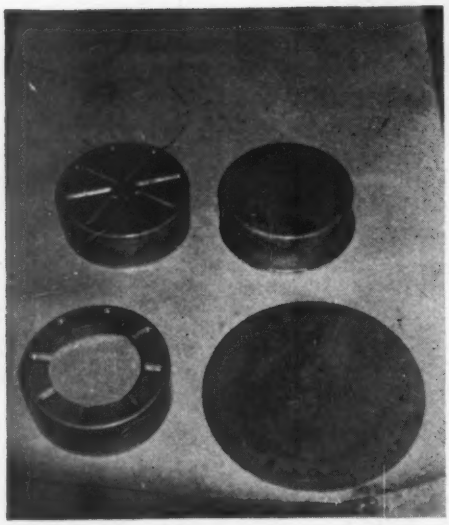
Some indication of Monarch's production and machine facilities is evidenced by the fact that on top of this huge fin and crate schedule, the company has also turned out water chests for cooling machine guns, various types of ammunition containers, ammunition armor piercing cups, highway flares (peacetime article) and other items.

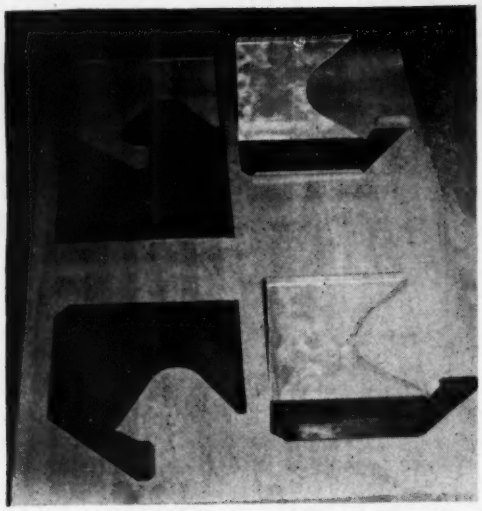
Fins, precisely fabricated and assembled, guide bombs straight and true from the plane to the target. U. S. Army Air Forces photo.

Bomb Fins

Most readers are no doubt familiar with the purpose and the general appearance of bomb fins; these items having been displayed widely. The fins are formed of 14-gauge, WD-1010 hot rolled, pickled black sheet. As the photographs show, the fins are composed of a cup-shaped sleeve which screws onto the tail of the bomb prior to loading in the plane and four vanes which guide the bomb in its flight. These four vanes are formed to be self supporting when spot welded together giving a box-like center with four corner fins 45-degrees from the box.







Left—Photo 1. The three die formations from blank to trimmed sleeve. The press above (Photo 2) has three stations, three operators, three sets of dies. All work shown in Photo 1 is completed before the sleeve leaves the press. Right—Photo 2. Another three station, three operator, three die set-up makes a fin complete from blank ready to weld to sleeve.

Monarch's fabricating schedule puts a blank into a large three-station, three-operation, three-operator, double crank press and produces the finished cup shown in photograph 1. In the first set of dies, the cup is formed from the flat blank (note flanged edge); in the second set of dies the bottom is embossed with eight radiating bosses; in the third set of dies the center of the bottom is cut out. This cup is known as a sleeve and is 14-gauge black iron.

The fins are similarly formed in another double crank press, this also employing a three-station, three-operation, three-operator set-up. Photograph 2 shows the set-up and photograph 3 shows the result. One die set cuts a fin from a flat blank and leaves a duplicate, but reversed fin, in the blank with a border. When the blank is reversed in the same die, the border is cut off, leaving the second fin. The second die set bends the fin-box to 45-degrees and puts on the inside

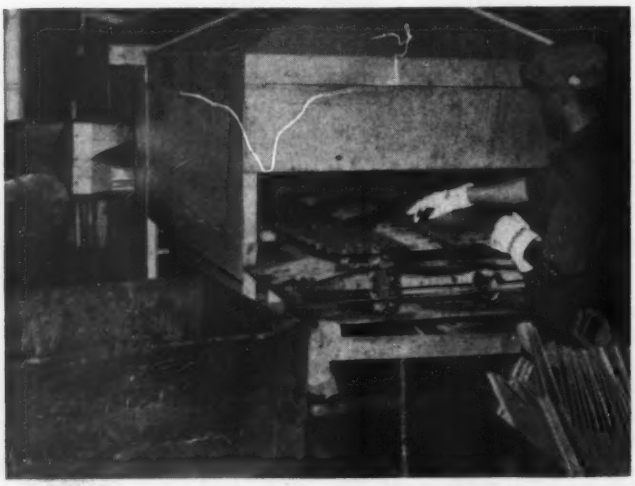


Photo 16—After forming and before welding, all parts are given a 2-minute alkaline wash and 1-minute dry in this forced circulated, gas-fired oven.

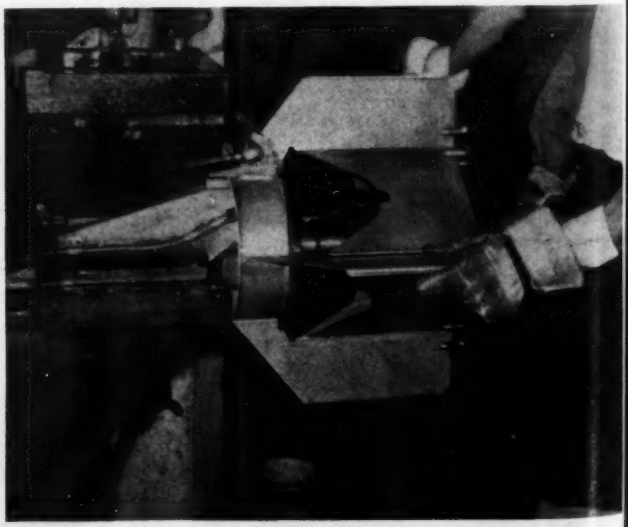


Photo 5—After assembly (Photo 4) the fin is spot welded to the sleeve at four points—four spots simultaneously at each point in the 150 KVA machine. Parts are in fixture (Photo 4).

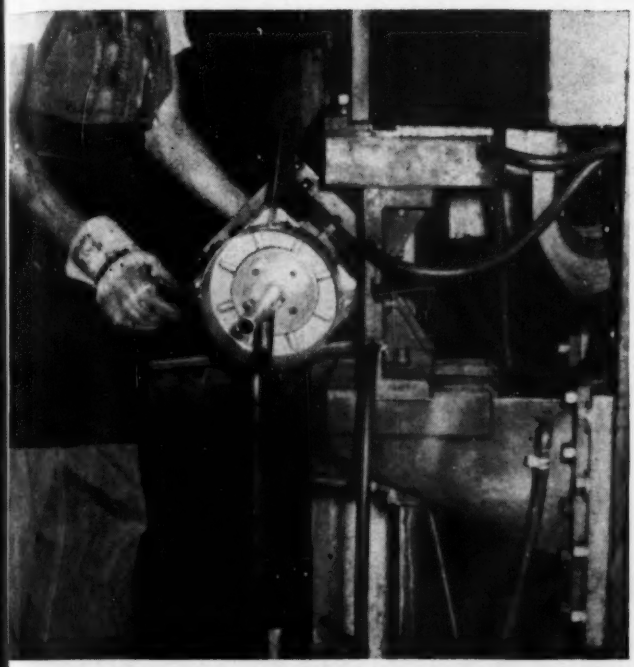


Photo 6—Still in the fixture, each pair of fins are spot welded together with eight spots made simultaneously in the 200 KVA machine. Right—Photo 4—This fixture took days of trial and error to perfect. The four fins and sleeve are locked in position with the pins and knuckled arms as explained in the text below.

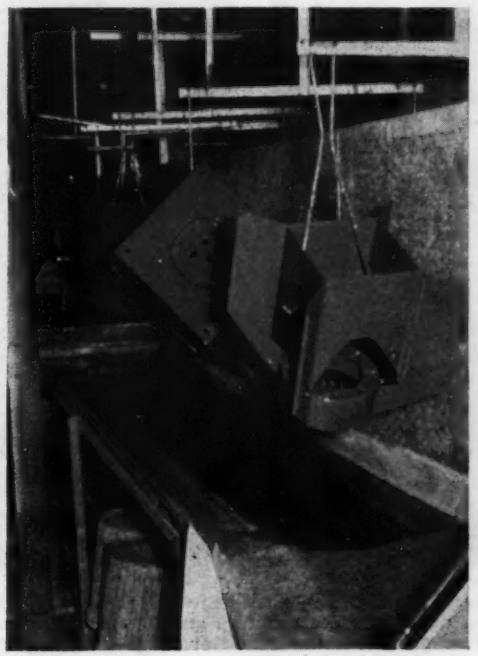
box edge flange. The third die set puts on one 90-degree flange.

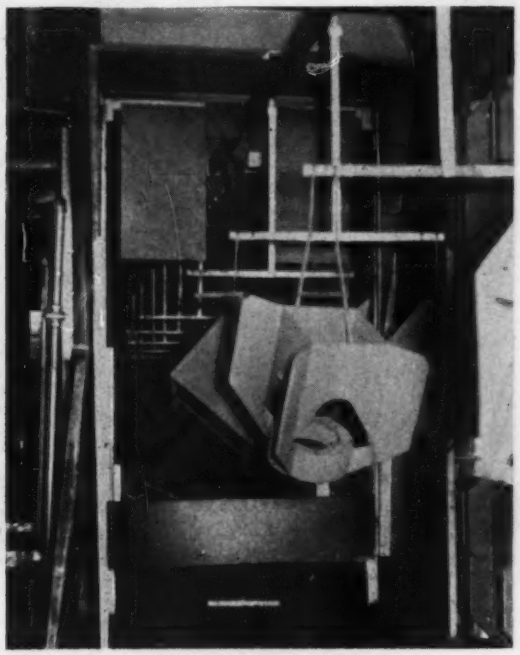
In operation, both of these three-die set-ups passes the piece straight ahead from the die (not sideways) thus reducing time and minimizing movement of material and operator's arms.

Before welding, the fins and sleeves are passed through a combination washer and drier where in three minutes each part is given a 2-minute alkaline solution wash and a one-minute gas flame drying to remove all oil, dirt. (Photograph 16).

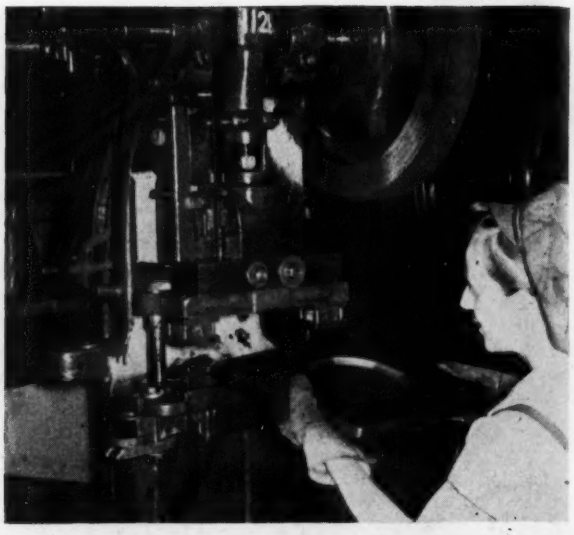
So far, the operations are quite similar to customary peace-time work. But the next step required days of thought and trial to develop the quick acting fixture in which the four fins and the sleeve are placed and locked in perfect alignment for spot welding the sleeve to the fins at four points (see photograph 5) and one fin flange to the touching fin to form the center box (see photograph 6).

The fixture in use when the photographs were taken keeps two men busy with both hands. The fixture bed plate has studs which hold the four fins in alignment. Up through the center is a stem with knuckled arms which, at one-quarter turn of the stem, pulls the four fins in tight against the cup and holds the cup in place.





Painting and drying are continuous on this overhead trolley. Left—Hung on the trolley, the fins dip down into the paint tank and emerge to drip on the pan. Right — The trolley continues into the oven and out without stopping.



Left—Photo 7—A shipping crate top is embossed in this press and flanged in one operation. Right—Photo 8—Then the top is punched for the four holes through which bolts are run (Photo 15).

The fixture is shown in photograph 4. This photo also gives an idea of how the two operators set the parts. The fixture remains locked until all eight spot welds are made and is then unlocked, the welded fin passed on and the fixture loaded again by the two-man crew. This crew does a real day's work to keep up with the spot welders.

The spot welds are interesting in that the cup is welded to each fin with four spots which are welded simultaneously in the 150 KVA projection welder as shown in photograph 5. The flange of fin to box has eight spots, all made simultaneously in a 200 KVA projection welder, as shown in photograph 6. These two welders, each taking four compressions to each fin, definitely speed up welding as compared with individual spots and handle the full production of the fins.

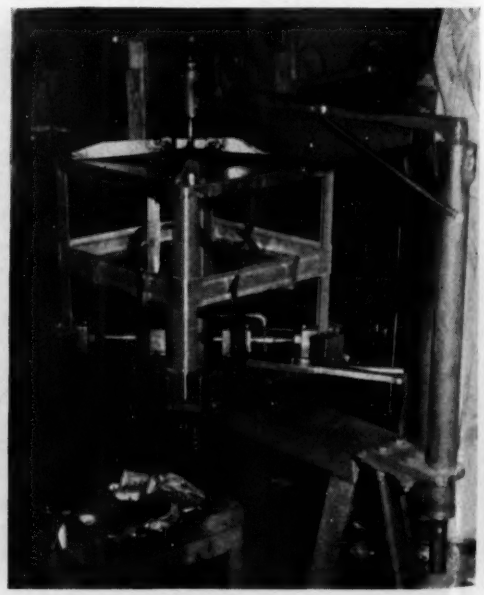
Shipping Crates

Each bomb fin must arrive at its destination in production condition and must be perfect—an imperfect fin means a lost "shot" at some target. So to insure perfect arrival, each fin is shipped in a metal crate which in point of man hours and involved operations equals the fin itself. The weight of metal in the crate is almost equal to that in the fin.

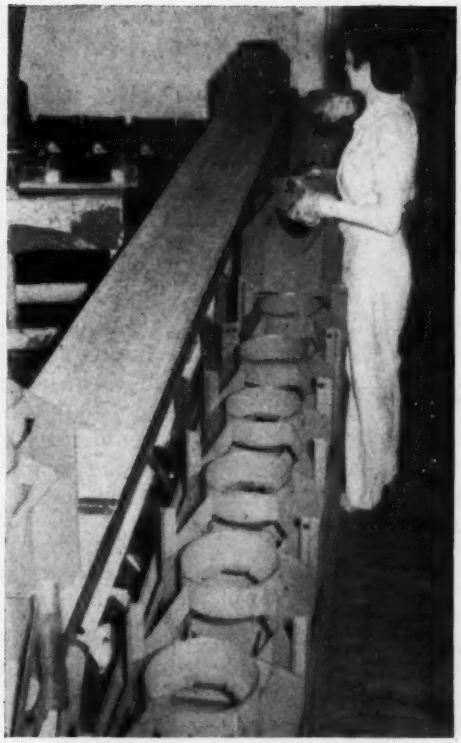
The crate is composed of a full metal bottom and full metal top and four angle corners and a center stiffening band running around the middle. This is also all spot welded.

Photographs 7 and 8 show two steps in forming the bottom—the blank is embossed and flanged in one set of dies (photograph 7) and in photograph 8 four holes are punched so that after the fin is in the crate a top can be bolted down as shown in photograph 15. The forming and cutting of the corner posts and the center stiffeners were not photographed, but these are standard press brake operations and strip is cut to length in a power shear before forming.

As in the assembly of the fins, special fixtures to hold the nine pieces of the crate (not including top) in exact alignment for spot welding required the most thought and the most complicated set-up. The final



Left—Photo 9—This pair of fixtures holds the six parts of the crate in position while the gun welder (just shown at left edge) makes 36 spot welds in the crate. Right—Close up of the crate fixture and interesting swinging arm clamp which keeps bottom in position and tight to legs. Base plate is heavy to offset rough handling in gun welding.



Left—Photo 13—The painted and dried crates and fins come off the trolley in background. Crew of girls put fin in crate and shove along to next station. Right—Photo 14—Next, top is put in place and the specified 5 rubber stamps are made on crate and fin (see photo below).

fixture is shown in photographs 9 and 10. The four legs are erected on a solid base. Clip fingers hold the strip mid-stiffener in place. The bottom is placed over the legs and with one quarter turn twist the center stem pushes all parts outward for tight fit.

Gun Spot Welding

The crate is now ready for spot welding, but in place of a multi-spot weld as in the fins, each spot must be separately made and most of them are in tight corners so that a goose-neck gun welder is used, as shown in photograph 9, to make 36 spot welds in the crate.

To keep production steady it is necessary to have two crate positioning fixtures each loaded by one man who puts the nine pieces in place and locks them. While the gun welder is making the spot welds the loader removes a welded crate from a fixture and loads it again.

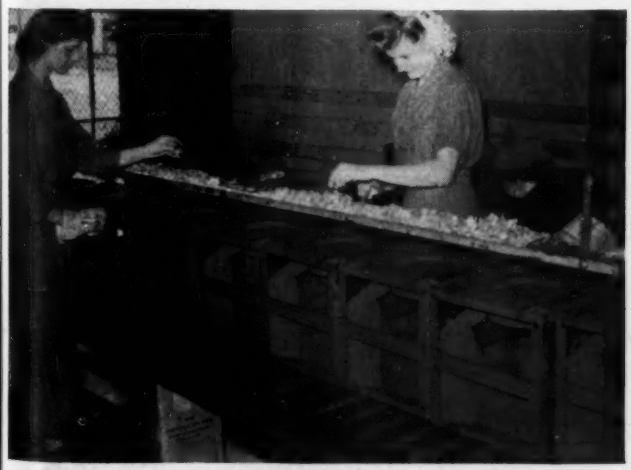


Photo 15—Finally, these girls bolt top to crate legs and the fin, crated against the roughest handling, is ready for shipment to our bombers overseas.

Finishing and Shipping

Each completed fin and crate must be given a red prime paint coat and a finish green coat and oven dried. Under a production schedule of several thousand units a day, painting must be rapid, progressive and integrated with fabricating and shipping departments.

Monarch's finishing department is planned around an overhead tramway and paint dipping. Fins and crates completed in the spot welding operations are only a few feet from the start of the dipping line. The units are hooked onto the line, pass down into the paint tank and up along a drip section and into the drying oven. Two minutes at approximately 300 degrees is sufficient for either the prime or finish coats.

Photograph 11 shows the paint dipping section and photograph 12 the units coming out of the oven—the whole painting section requires only two men, one to load and one to unload.

Up to this point in production, men constitute most of the employees excepting a few press operators. The crating for shipment department, however, is mostly women as photographs 13, 14 and 15 indicate. The painted crates and fins are placed on a stationary, roller conveyor where fins are placed in the crates (photograph 13) and the separate top put in position (photograph 14) and five rubber stamp identifications are put on the fins, sides and top of the crate. The last station in the line (photograph 14) is manned by two operators who clip the top to the crate. The finished assembly passes directly from this conveyor into the car. Clips are used so that at the destination the fin can be removed from the crate and put on the bomb while the crate is saved and is later sent to a metal-salvage station.

Refrigerant-Cooled, Spot-Welding Electrodes* [Part 1]

By Dr. F. R. Hensel,† E. I. Larsen,‡ E. F. Holt§

Introduction

In recent years refrigerant cooling of resistance-welding electrodes has received an increasing amount of attention and considerable experimental work has been carried out in laboratories and in the welding departments of the users of welding machines. More recently a number of commercial refrigeration systems have been placed on the market for the cooling of resistance-welding electrodes. The amount of published information on the benefits of refrigerant-cooled welding electrodes is very meager. Therefore, the present authors have carried out an experimental program in an attempt to determine some of the fundamentals of refrigerant-cooled welding electrodes. The work reported is, in a sense, a continuation of their paper entitled, "Thermal Gradients in Spot-Welding Electrodes" (*The Welding Journal*, 20 (12), 850-856 (1941).

Table 1—Electrical Properties of Copper and Copper Alloys at Low Temperatures

Temp., ° C.	Specific Resistivity, Microhms/Cm.³ Copper	Elkaloy A	Mallory 3	Electrical Conductivity, % of I.A.C.S. Copper	Elkaloy A	Mallory 3
24	1.768	1.860	2.048	99.2	93.6	85.2
13	1.685	1.792	1.972	104.7	98.4	89.4
11	1.67	1.781	1.954	105.6	99.2	90.2
0	1.597	1.706	1.883	110.5	103.5	93.7
—7	1.544	1.657	1.832	114.3	106.5	96.3
—10	1.528	1.634	1.812	115.5	108.0	97.3
—15	1.486	1.598	1.774	118.8	110.5	99.3
—20	1.468	1.571	1.752	120.9	112.3	100.6
—25	1.428	1.537	1.714	123.8	115.1	102.8
—30	1.401	1.508	1.684	126.4	117.4	105.1
—33	1.369	1.481	1.657	128.8	119.2	106.4
—40	1.292	1.401	1.587	136.2	125.3	110.7
—46	1.262	1.374	1.552	139.2	127.8	113.2

Scope of the Investigation

Since this work was carried out in connection with projects of the Aircraft Resistance Welding Committee, the experiments were confined to the spot welding of aluminum alloys. Furthermore, it appeared that refrigerant cooling would show real advantages in the welding of aluminum and its alloys because of the difficulties that have been experienced with metal pick-up by the the electrodes. Comparatively high-current densities are used in the welding of aluminum and the increased electrical and thermal conductivities due to refrigerant cooling seem to be advantageous. The authors realize, however, that the field may be considerably broader, as evidenced by the data recently published on the use of refrigerant-cooled electrodes for welding of armor plate and ferrous materials.

Effect of Decreasing Temperatures Upon the Electrical Properties of Electrode Materials

Before proceeding with actual welding tests, it was deemed advisable to determine the electrical conductivity of copper and hard alloys, commonly used for aluminum welding, as a function of decreasing temperature.

The specific resistivity and the electrical conductivity are given in Table 1 and are shown graphically in Fig. 1. It is evident that there is a substantial increase in electrical conductivity as the temperature is lowered. Of special interest are the values for 0° C., because in some instances, refrigerant cooling has been utilized within the range permissible with artificially cooled water. The electrical conductivity at 0° C. for copper, Elkaloy A and Mallory 3, is as follows:

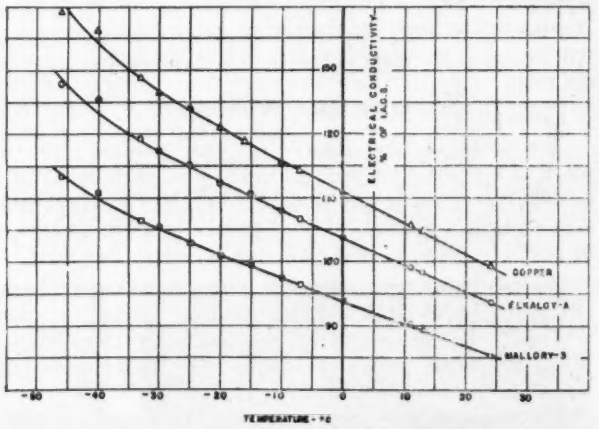


Fig. 1—Electrical conductivity of Mallory 3, Elkaloy A and copper at low temperatures

Copper.....110.52% of I.A.C.S.
Elkaloy A.....103.5 % of I.A.C.S.
Mallory 3..... 93.7 % of I.A.C.S.

A subzero temperature which is readily obtainable with a brine solution is —25° C. At such a temperature, the electrical conductivities of the above materials are as follows:

Copper.....123.81% of I.A.C.S.

*Presented at the Annual Meeting, A.W.S., Cleveland, Ohio, Oct. 12 to 15, 1942.

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Table 2—Thermal Conductivity of Copper at Low Temperatures

Temp., ° C.	Thermal Conductivity, Cal./Gm./Cm./Cm.²/Sec., °C.
100	0.90
50	0.920
20	0.923
0	9.980
— 73.7	1.05
—190	1.42
—200	1.95
—250	21.0

Elkaloy A.....115.1 % of I.A.C.S.
Mallory 3.....102.8 % of I.A.C.S.

The thermal conductivity of copper also increases with lowering temperatures. The increase, however, is quite small within the range suitable for practical purposes, as may be seen in Table 2.

There is considerable discrepancy in the literature regarding values for the thermal conductivity of copper, but it is quite evident that there is a very steep rise at temperatures near —250° C.

Preliminary Experiments

The investigations related in this paper were conducted primarily to collect theoretical data on temperature distributions in resistance-welding electrodes. Comparative thermal conditions existing during spot welding, when using either conventional water cooling of electrodes or refrigerant cooling, were investigated. The resistance welder employed in conducting the preliminary work was a conventional a.-c. 100-kva. press-type machine.

Final experiments were carried out on a heavier

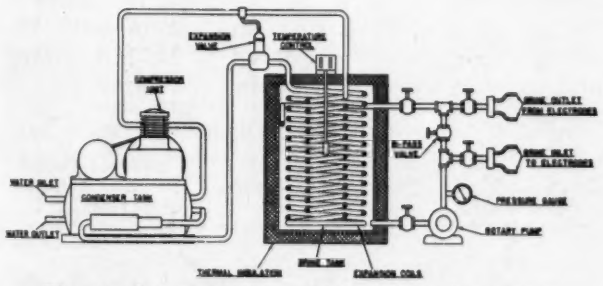


Fig. 31—Schematic diagram of refrigerating system

150-kva. conventional a.-c. press type welder. This latter welder, because of its more rigid construction and higher pressure and current capacities, was better suited for the spot welding of aluminum alloys.

The authors appreciate the fact that production spot welding of aluminum alloys is being done primarily with stored energy resistance welders. Our tests have not been extended to this type of welding, since the equipment was not available in our laboratory.

Electrodes operated at subzero temperatures were cooled by a circulated calcium chloride brine solution having a specific gravity of 1.28 gm./cc. The brine solution was cooled by a refrigerating

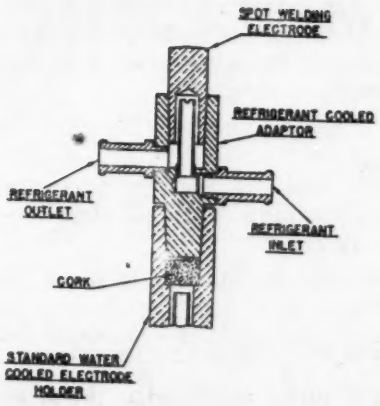


Fig. 4—Special Electrode Adaptor

system consisting of a single-stage compressor unit connected to a closed freon system. The expansion coils for the gas were immersed in a tank containing the brine. By this method it was possible to cool the brine to a temperature of —47° C. With the brine at this temperature, the welding faces of the electrodes could be cooled to —35° C. A schematic diagram of the experimental refrigeration setup is shown in Fig. 31. A more detailed description of the refrigeration unit is given in Appendix A.

In order to obtain the maximum efficiency of cooling and to prevent the chilling of the more massive parts of the secondary circuit of the welder, a special electrode adaptor was designed and is illustrated in Fig. 4. The special adaptor was constructed to fit into the No. 2 Morse taper of a standard water-cooled electrode holder. The flow of the refrigerant was confined to the adaptor, while the balance of the electrode holder was water cooled in the conventional manner. To prevent the formation of ice inside the water-cooled holder, a section of thermal insulation was provided at the bottom of the adaptor. The use of the adaptor and holder made it possible to avoid the frosting of the holder arms and platens of the welder. This is quite essential because the condensation of moisture or frost on the welder parts, and particularly on the steel parts, will cause a rapid corrosion.

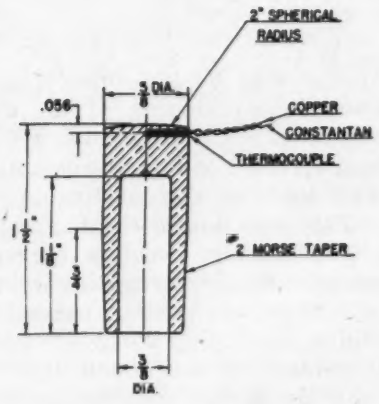


Fig. 5—Test Electrode

Water was circulated through the welding transformer, arms and main body of the electrode holder, keeping these parts at a temperature of approximately +25° C.

Some of the preliminary welding tests were carried out on 17 ST aluminum alloy, 0.040 in. thick. The welding surface was prepared by mechanical cleaning, such as steel wool with a powder abrasive.

The electrode design used in all of the welding experiments is shown in Fig. 5, and the position of the thermo-couple in the electrode nose is indicated.

Elkaloy A metal was used as the elctrode material. In order to avoid frosting of the electrode tips when operating at subzero temperatures, a thin coating of glycerine was applied to the tip faces.

Effect of Refrigerant Cooling on Tensile Properties

To determine the effect of electrode temperature on the strength of welds made under identical welding conditions, a series of single-spot specimens were prepared to test shear strength in tension. The first set was welded using water-cooled electrodes, the temperature of which was +13° C. before welding. The second set was welded using refrigerant-cooled electrodes, the temperature of which was —30° C. before welding. The welding conditions were as follows:

Delay time.....8 cycles
Weld time.....8 cycles
Hold time.....16 cycles
Electrode force...600 lb.
Secondary current.22,500 amp. r.m.s.
Heat control.....100%

Tensile tests on the two sets of specimens disclosed no appreciable difference in the weld strength. The following shear strengths were obtained:

Sample No.	Tensile Strength in Shear, Lb./Spot Refrigerant-Cooled Electrodes	Water-Cooled Electrodes
1	450	464
2	467	493
3	479	480
4	466	496
5	487	453

It was found that on the 100kva. press-type welder, considerable skidding of the electrodes occurred under welding pressure. It will be noted that the shear strength values aforementioned are comparatively low for this particular material and gage. This was due to the fact that a sufficiently high secondary welding current could not be used because an increase in welding current was always accompanied by excessive expulsion of metal at the faying surfaces of the materials being welded. It was found definitely that the expulsion at higher welding currents was caused by the skidding of the electrodes.

This skidding was caused principally by:

(*a*) Transverse movement of the quill due to play between the quill and gibs.

(*b*) Elastic deflection of secondary members, welder arms and electrode holders.

The effect of skidding was studied in further detail and it was found that the welding electrodes, when operated under such conditions with no welding current passing the electrodes, would pick up a considerable amount of aluminum mechanically. This metal pick-up occurs during the first operation. It is quite likely that this condition may exist in many commercial applications where complaints are registered that the electrodes pick up aluminum rather rapidly. Other investigators have recognized the necessity of electrode rigidity.

Effect of Refrigerant Cooling on Electrode Temperature During Continuous Welding

Continuous welding tests were made at a speed of 50 spots per minute using water-cooled and refrigerant-cooled electrodes.

During welding, readings of thermal voltage from the copper-constantan thermocouple imbedded in the electrode were observed on a potentiometer. Temperature conversions were made from the millivoltage readings and in Table 3 are given the results of tests carried through 100 continuous spot welds on both water-cooled and refrigerant-cooled electrodes.

The temperature of the water-cooled electrodes prior to welding was +13° C., while the refrigerant-cooled electrodes were at —28° C. While there is an appreciable temperature difference between the water-cooled electrode, and the refrigerant-cooled electrode, observed in Table 3, the actual measured tip temperature with the refrigerated cooling appeared to be fairly high at a welding speed of 50 spots per minute.

Table 3

No. of Spot Welds	Refrigerant-Cooled Electrodes, Temp., °C.	Water-Cooled Electrodes, Temp., ° C.
0	—28	13
10	47	133
20	54	144
30	54	146
40	56	146
50	56	146
60	56	146
70	56	148
80	59.5	148
90	59.5	148
100	59.5	148

General Observations from Preliminary Tests

(*a*) In using the calcium chloride brine at such low temperatures as —40° C., there was a strong tendency for the solution to precipitate calcium chloride. This was troublesome when it occurred in the holders or on the holder tapers. Partial evaporation of the water from the brine on the tapers created a very objectionable deposit of salt.

(*Continued on page* 101)

Collector to Separate Dust from Shavings

IN the December, 1942, issue we asked readers to submit their plans and suggestions for a collector (cyclone) which would, within itself, separate dust and shavings from the air stream and also separate the dust from the shavings so that each might be removed through a separate outlet at the bottom.

A number of plans were suggested—and with minor variations all plans were similar to the drawing on this page. This particular layout was submitted by H. M. Nichols, B. F. Sturtevant Company, and author of several "blow piping" articles in recent months.

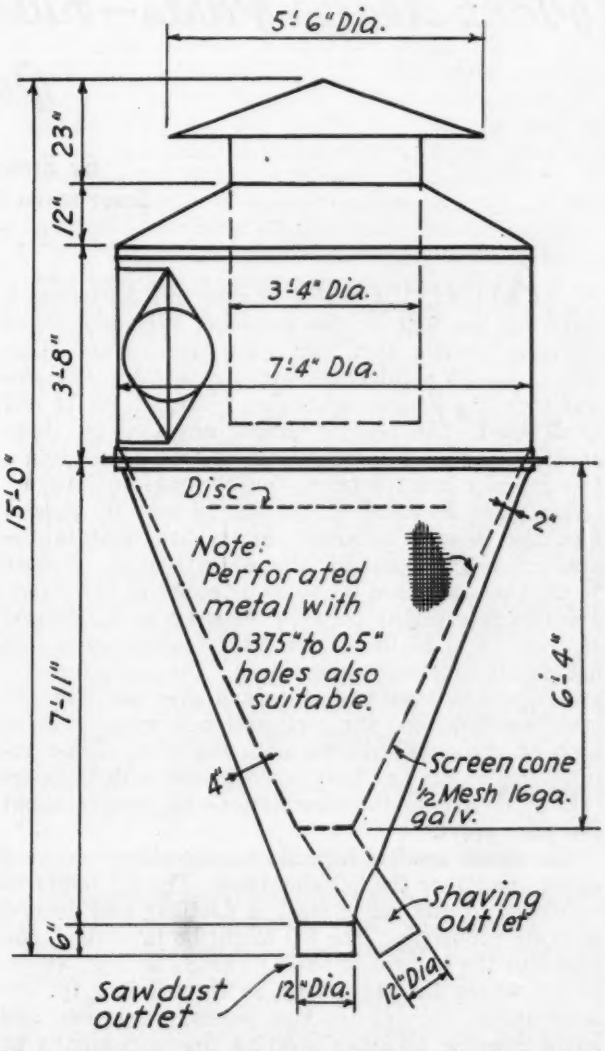
Other readers—H. S. Garrigus, North East, Penna.; D. J. Maresh, Cedar Rapids, Iowa; J. L. Browning, Atlanta, Ga., submitted the same layout, or closely resembling this.

The drawing is self explanatory, but it might be said that the scheme depends for successful operation on the screen inside remaining clear of shavings. It is possible that some kinds of shavings or waste would cling to the perforations or holes or might clog the screen up—if this is feared, some thought might be given to the size of the holes or perforations. Either mesh or perforated metal can be used and suggested sizes for the openings are noted on the sketch.

"Standard Practice in Sheet Metal Work" shows two variations of this general plan on page 535, drawings M and N and suggests that the screen may be carried up as high as the plate (top of the cone) or clear up to the deck (top of cyclone). Also, that perforated holes ⅜ to ½-inch on ¾-inch centers or No. 10 wire with ¼-inch mesh is satisfactory.

In this type of separator, the standard dimensions of the pipes discharging from the fan and the air exhaust opening and of the separator, itself, should be followed to obtain a low air velocity inside the separator. The drawing shows these dimensions for one size of separator handling roughly 30,000 cubic feet of air per minute.

There is a variation of this design sometimes used —this variation employes two spouts for the dust placed alongside the one center spout for the shavings.



The advantage claimed is less "packing" of the dust or, rather, easier emptying of the dust if the dust is a type which packs readily.

On Our Industry's Front

(*Continued from page* 42)

(1) "Ships—$1,594,000,000. This comprises 305 destroyer escorts, 195 patrol craft, and 21 other vessels.

(2) "Major ordnance items—$846,000,000—comprising principally guns and mounts, cartridges, shells, ammunition, underwater ordnance, fire control, bombs, and pyrotechnic equipment such as rocket-flares and very lights.

(3) "Aircraft—$226,000,000—comprising trainers, transports, lighter-than-air craft, gliders, outmoded patrol bombers and scout observation planes.

(4) "Shore establishments—$47,000,000.

(5) "Coast Guard construction of all types—$143,000,000."

At the same time that certain types of naval aircraft are being cut back, heavy expansion in fighter and bomber output is projected for 1944—a jump of 60 per cent more than 1943, reaching a total of $4,000,000,000 by the end of the year.

OWI said the fact that the shipyards under the direction of the Maritime Commission have abandoned the seven-day week for a six-day week has given rise to reports that cutbacks in merchant shipping were in progress. On the contrary, the U. S. Maritime Commission says that the tentative 1944 shipbuilding program calls for approximately 20,000,000 deadweight tons of new shipping, as compared to 19,000,000 deadweight tons completed during 1943. A total of 1,799 vessels is planned, of which 339 will be Victory ships, 820 Liberty ships, 300 C-type cargo vessels, and 340 tankers.

In a recent detailed statement on Army cutbacks, the War Department, foreseeing no immediate relaxation in production, said that its broad program for 1944 would be larger than in the past year.

Curtailment in production of raw materials, due in

(*Continued on page* 100)

Temporary Dies and Fixtures

(Plane Heater Parts—Rubber Forming, Drop Hammer)

Part 2

By Ernest E. Zideck
Sheet Metal Consulting Engineer

ALUMINUM sheets worked into parts which make up the hull of the airplane, variously called fuselage, nascelle, skin, web, wing covering and other names, are of a thickness varying between .022 and .064 inch, the gauges comparing to 24, 22, 20, 18 and 16 of steel. The heavier gauges are used for bulkheads, stringers, reinforcements in vital places and a few interior constructions; but the mass of the exterior plane is metal of the 22, 18 and 16 gauges. Extruded shapes in great variety are used in the skeleton body. Specially shaped extrusions of near ⅜ thickness are used for spars or beams of the wings. The ribs intervening between the spars at an interval of from 18 to 26 inches are either formed sheets or flat sheets riveted to extrusions. Corrugated sheets are in use between the spars and over the ribs. In other constructions the corrugation is replaced by a kind of "troughs" riveted onto the ribs. These reinforcing means are then covered with a light gauge "skin," riveted to the corrugations or troughs about one inch apart.

The sheets used in aircraft are by ninety per cent either the ST or the SO aluminum. The ST might be compared to cold rolled steel in ductility and general working properties. The SO might be favorably compared to the hot rolled sheet. The ST is used everywhere where the sheet may be formed into the desired shape, such as fuselage panels, wing webs and skins, cowling, all other covering panels requiring no difficult forming. The ST is used because it is hardened in the process of forming the sheet, same as the cold rolled sheet is. The SO formed parts, unless used for ducts and interior appliances requiring no toughness of metal, must be heat-treated after formation, to make them withstand the "stress" calculated for them. This heat-treating of the SO formed parts is a sore to all air-crafters, because the process "unfolds" and otherwise disfigures the formed part and the part must be reformed, mostly by hand, to be made usable. In this connection it is of utmost importance for the "processer" of sheet metal parts to know the formative means at hand and gauge the feasibility of prescribing ST material wherever the means are available to form the comparatively hard metal into the desired shape. On the other hand, where the means are known to be deficient in providing formatures specified, the SO material is the better to use.

Forming Aluminum by Rubber

This formative means is commonly known as the Hydro-Press. The press is a huge structure, partially built below ground, and reaching many feet above the floor. Many of these presses have "platforms" or beds fifty square feet or larger in area, with a pressure capacity ranging from 5,000 tons upward. The lower platform of the press is solid steel, equalling a surface plate. The upper, movable part of the press, is anchored to four or more machined posts, up to 14 inches in diameter, and it is on these posts that the weight of the metal slides up and down. In Fig. 1, of the drawings, is shown a portion of the movable part of the press. It will be noted that it resembles a frame, a kind of "box," which is filled with resilient rubber. On the lower platform, as noted under (A), (B), and (C), are arranged a number of forms, the forms provided with steel pins over which the "blank" pieces of metal are inserted to remain in position under formation. The descending rubber presses the metal down over the blocks, enveloping itself all around the form, pressing the metal in and about the form.

Hydro-Press forms are made of either wood, Masonite or steel. The form-block (A) is shown to be wood, because its formature will allow for equal pressure from the sides, and maple or other such wood will easily withstand the pressure. Form (C) is shown to be of Masonite, because here the pressure is unequal and wood might not stand up under it. The Form (B) is of steel, because the pressure in the

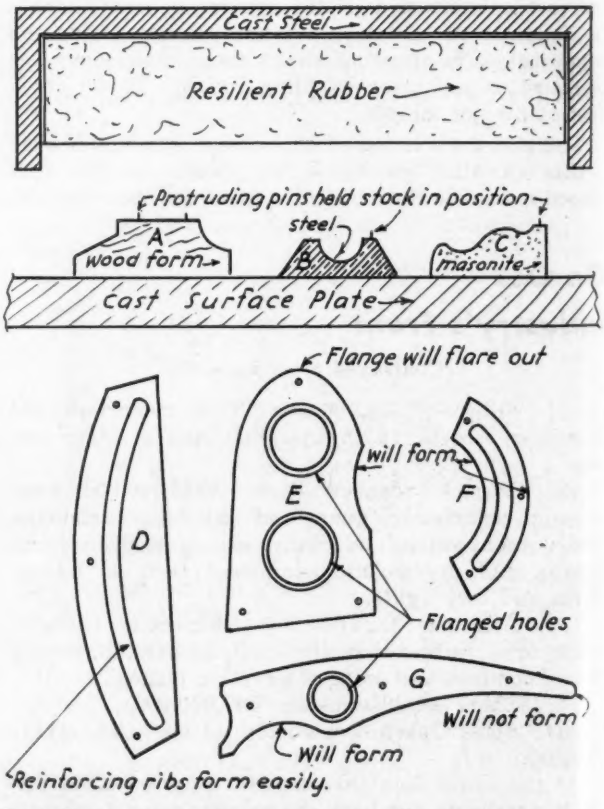


FIG. 1 CROSS-CUT SECTION OF RUBBER FORMING ARRANGEMENT

"trough" would crack both wood and Masonite. It will be noted that the placement of the stock-holding pins must be calculated to allow for the metal to "flow" into position. This is not a "stamping" operation. It is purely a metal forming operation, by which metal flows into the molds without stretching. Accordingly, the form-block (A) shows pins placed laterally one from the other, because there is no "metal-flow" between the pins. The form-blocks (B) and (C), on the other hand, can have pins on only one side, so the metal can flow freely sideways from the pin.

These form-blocks, larger and smaller in size, are not fastened to the platform. They are placed sufficiently far apart to allow the rubber to flow in between them. In many cases it is necessary to "back up" the forms, extending the block sideways and providing it with a pronounced upward step, which then forces the rubber into the cavity formed by the step, the mass of rubber compressed into the cavity exercising pressure sideways. This backing-up of the form-blocks is practically a necessity if we work ST material extending, flangelike, over the sides of the form.

Limitations of Rubber Forming

The "processer" (process-writer) specifying certain machine operations and work to be done in sequence of operations must be very careful in the selection of, not only the material, but also the work-process itself. Under (D) we show a "rib", reinforced by a 1-inch wide by ⅜-inch deep bead. This bead will form in ST material. So will the ⅝-inch radial flange, if the form is properly backed-up. Straight portion flanges are best done on the pres-brake, before the part has been processed through the rubber. Were the bead less than 1 inch wide, or were the depth more pronounced, the rubber might form it in SO material, but it will not do so in ST.

Under (E) is shown another variety of rib, very common in the leading edge, flaps, elevators and similar structures. The "lightening" holes are provided with a reinforcing bead-flange, and a ⅝-inch wide flange runs all around the rib. The bead around the hole will form in ST material, because there is a comparatively large mass of the rubber (and corresponding pressure) concentrated on top of the rib. The inward curving flange will form with a proper back-up. So will the flanges with only a slight radial contour. But the extreme tip of the rib, having a radius of less than 3 inches, will form to less than 60 degrees, and the flange will flare out no matter what back-up we provide.

Similar problems are encountered in formations shown under (F) and, more so, under (G). The tip of (G) in particular needs study before specifying by what means the flange should be worked. The tip of (G) will not form, in rubber, even if we use SO material. (Commonly the mistake is made of figuring that the 17,000 ton pressure, for instance, will do anything. But the processer, in this and similar instance, forgets to figure how little of the 17,000 ton pressure centers around a small area such as is the tip in (G).

In this instance, of a small radius part being flanged ⅝-inch for riveting, irrespective of whether ST or SO material is specified (and where no scallops are provided for), the process of forming the part should be reversed; instead of the flange being brought to the desired degree after the metal has been that much more hardened by processing it through the rubber, the critical portions of the flange (and other such formations) should be done by wedging the metal over the block by hand, and then the part may be put into the press to finish the formation. For instance, the part (F) might be difficult to form of ST material. The proper way is to form the straight sides in the brake, insert the part over the block, wedge the flange over the block by hand, and insert the part reposing on the block for the rubber to form the bead and smooth the radial portions of the flange. That same process would apply to (E) and (G), and also to (D), if ST material is used in preference to the heat-treatment-requiring SO and hand "line-up" after.

It is a fact that when the rubber-hydro-press first came into use the engineers and the processers were imbued with the idea *that anything can be formed* in the miraculous contrivance. Since, having had a heap of sad experience with it, more caution is being displayed. As described, the rubber will form the metal easily to a certain depth, if there is enough pressure area available at the critical point. It will not form narrow beads, nor will it form sharp enough bends in ST or heavy gauges, and it will not form small radials sideways. At that, with the proper outline of operations, (a) straight bends being done first, in the press brake; (b), critical radial portions being wedged over the block by hand; and (c), completing over the block in the rubber as a final operation; the hydro-press will perform remarkably, especially if we consider that a dozen or more parts can be processed through the rubber at one time. One thing should be remembered: after heat-treatment, there is no use putting the part back into the hydro-press. It will come out of the press distorted exactly as it was in the first place.

Blanking-Piercing by Plate Dies

This arrangement is widely used in the fabrication of aircraft parts. It differs from the conventional die-work in that 3/16, ¼ and 5/16-inch thick plates are used for both the male and the female dies. In Group 2 of the drawings we show, under (A), the male die of the form of blank (C) bolted to another plate which bolts to the descending part of the press. One-half inch or larger holes are drilled halfway in the upper plate, the holes spaced all about the lower plate and sticks of half-hard rubber are glued into the holes. The rubber extends over the lower plate and serves for stock-hold-down, also for expulsion of the surplus

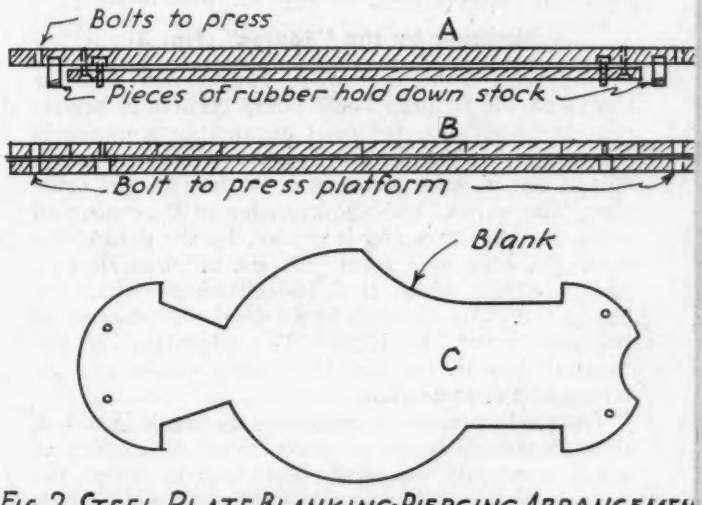


FIG. 2 STEEL PLATE BLANKING-PIERCING ARRANGEMEN

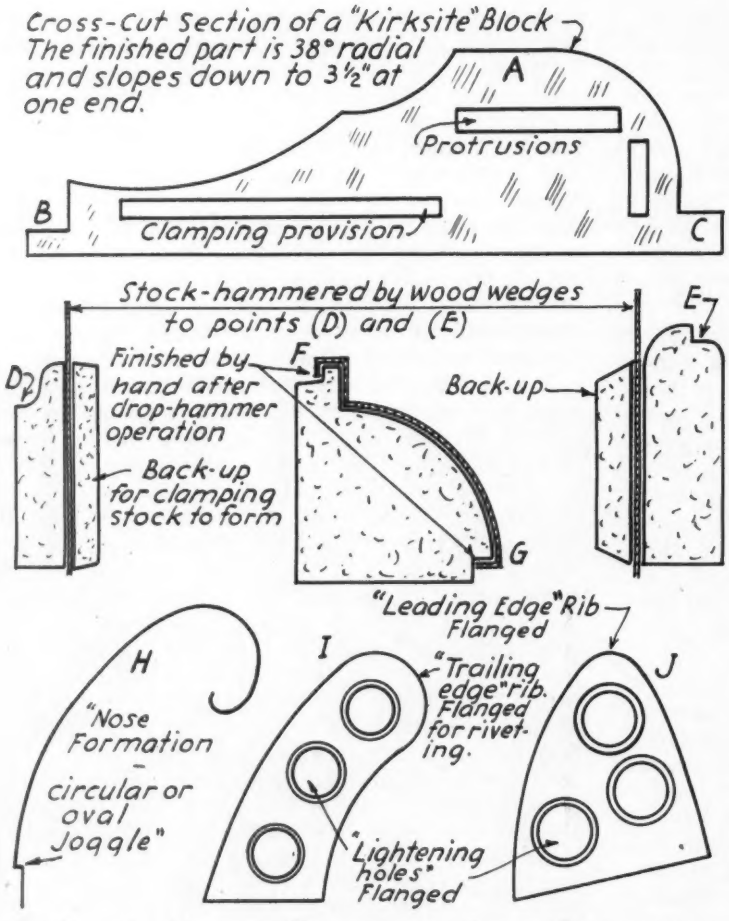


FIG. 4 HAND-FORMING OVER BLOCKS

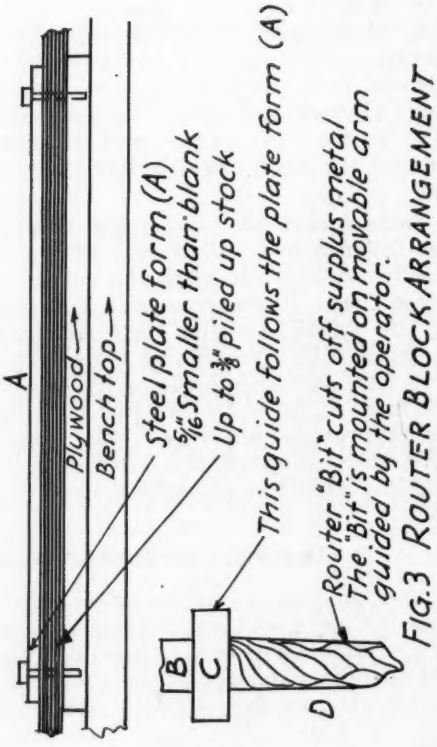

A
Plywood
Bench top
Steel plate form (A) 5/16" Smaller than blank
Up to ¾" piled up stock
This guide follows the plate form (A)
Router "Bit" cuts off surplus metal
The "Bit" is mounted on movable arm guided by the operator.
B
C
D

FIG. 3 ROUTER BLOCK ARRANGEMENT

metal from the upper die. Punches, with caps lodged in the upper plate, protrude through the lower plate, matching corresponding holes in the female die. The lower plate of (B), towards which the male die descends, is also provided with similar rubber sticks (not shown here). These rubber pieces push upward to reject the blanked-out metal.

These plate-dies are used for thin metal blanking-pierćing. Any multi-cornered blank, similar to (C), especially blanks provided with multiple rivet or bolt holes, are punch-pressed by these means to advantage. But the heavier gauges of metal, thicknesses above .050, will not prove easy to work by these means.

Blanking by the "Router" (Fig. 3)

For metal blanking heavier gauges and also for blanks having no pronounced sharp corners as prominent in blank (C), the most advantageous means is the "router." This machine operates like a drill press, only it has movable arms, easily guided by the operator. The router "bit" shown under BCD is mounted in the movable arm and is guided, by the guide (C), along the edge of a form (cut out of plate about a ¼-inch thick) which is 5/16-inch smaller than the blank; otherwise the plate is an exact reproduction of the contour of the blank. The advantage of the "router" lies in the fact that many blanks are obtained at the same time.

The steel plate, cut to reproduce the blank, is bolted, through several layers of sheet metal, to a block of wood, commonly ply-wood, and this is called the "router block." The arrangement of plate, metal layers and wood block is clamped or bolted to the bench top. The router arm with the rotating bit (rotating at a very high speed), is brought in contact with the sheets of metal protruding over the block, the rotating bit cutting into the sheets along the contour of the guide-plate, "routing" surplus metal from the blank. The guide (C) on the router bit needs only to be held tight against the guide-plate and the router arm guided along it, and the several sheets of metal underneath are cut to the exact contour of the guiding plate.

If there are corners to cut inside, such as shown in blank (C), these are drilled beforehand to about 5/16-inch dia. In the assorted blanks the router glides over the holes and continues on its way. If there are large holes or openings of any size in the blank, the guide plate and the wood block are provided with duplicate holes, the steel plate always 5/16 inch larger than the opening to be cut, because the guide on the bit takes up the difference. For inside holes or openings in the blank holes are pre-drilled through the blanks, admitting the router-bit. The metal pieces processed through the "router" need only to be burred and filed out in the sharp corners, predrilled, to be ready for further work.

Hand-Forming Over Blocks

Under Group 4 of the drawings we are illustrating hand-forming over blocks referred to on the foregoing pages. Hand-forming over "kirksite" blocks has been developed in the automotive industry, where practically all sheet metal parts going into "new models" were formed, by wood wedges, over kirksite blocks. "Wedg-

ing" over a block is an intricate operation. The worker uses a hammer to drive diversely shaped "wood" wedges. Sometimes he may use the mallet. He clamps the sheet over the form, commencing at the top of the form, using solid wood planks, boards, two-by-fours and, in the latter stages of formation, wood blocks shaped to form, to hold down the metal tight against the form-block.

He commences with wedging down the metal about ⅛-inch at one time, proceeding with the ⅛-inch all around and about the block. (We must remember that the form is radial, not straight). By the time the sheet is "wedged" down, tightly over the metal of the form, by about ½-inch, the sheet will flare upward, and the worker uses the mallet over a wood "stake," straightening and shrinking the metal. Progressing ⅛-inch at a time, the work will take time, but if the worker keeps to the rule of not taking in more metal at a time than wise, he will have no difficulty laying the sheet tight against the form, no matter how intricate, deep and diversified the formature. This can be done in steel as well as in other metals. (A), above the form-block, shows where the metal is clamped down at the beginning of work. (B) and (C) show where the sheet ends after it is formed. By wedging the metal into the corners, producing a sharp bend, the sheet will "stay put," even after the surplus metal extending over BC has been sheared off.

In the aircraft industry, such formatures as shown under (D) and (E) would be difficult, if not impossible, in the hydro-press or other means. The rubber would make the bend in (D) and the radial bend in (E), but it would not creep underneath easily to complete the rest of the formation. And, as above said, processing through rubber will harden the metal and make it unsuitable for further hand forming. Therefore, forming by hand over the block, shearing off surplus metal after forming, is the best thing to do.

Under (F) in this group of drawings we show a section of engine cowling, three or more lengths of the formature joined together forming a ring about the engine exhaust leads. Owing to the heat imparted to this sheet metal structure, it usually is made of stainless steel. Rubber will not form stainless steel, so the part is formed in a drop-hammer. But the drop-hammer operates vertically only, forming all but the two flanges if the block shown were cut off to repose on what is now the corner. The two flanges FG must be formed additionally, usually by hand. This is done by having a wood form cut to the contour of the part already formed clamped over the metal, tight against the form, and using the "wedge" process shaping the two flanges.

Under that same Group 4 of the drawings we show two instances of "wedge" forming prior to finishing in the hydro-press. The two ribs, (I) and (J), show such small radius flanging operations that it is a foregone conclusion the rubber will not form the flanges to the specified degree of bend, even if SO material is used. The processing here should be: (a) blank or rout to size and contour; (b) burr; (c) form the straight portion in the brake; (d) form the radial portions (the tips) by "wedging" over the block; (e) insert into hydro-press for finishing up the flanges and the beads around the lightening holes.

The part shown under (H) is a section of the plane "nose." Difficult as the formation appears, it is a rubber job excepting the "joggle," which must be finished by hand. The "nose" usually is made of three sections, riveted together. Joggles in the sections provide a smooth joint. The sections are formed of SO and heat-treated after. Heat-treat does not damage this formation, because it is multi-radial throughout, and formatures of this kind "stay put."

Stack Drilling Rivet Holes

Under Group 5 of the illustrations, (A) shows a section of the "web" that connects (horizontally while under construction), the two wing spars to which connect either the leading or the trailing edge. The web is riveted to the spar by a double, staggered, row of rivets, spaced about one inch apart. Across the web, from spar to spar, there are a series of "stiffeners," usually extruded angles. These angles rivet to the web by similarly arranged rows of rivets. Considering that the wing is 50 and more feet long, we see that in this portion of the wing alone, the web between the spars, there are thousands of rivet holes to be drilled. Though, lately, the "strippet" arrangement has been used, punching a series of holes at one time; and though there also are "Erco" riveters employed in this connection, punching and riveting simultaneously, there still is considerable stack drilling done in the aircraft plants.

Stack drilling may be done in various ways. The old fashioned way calls for the template or the pattern, provided with small holes for marking the underlaying sheet through them. A center punch or prick punch is applied marking the holes by small dots in the sheet. Then this marked sheet is clamped on top of several other blanks, preferably unto a plank that will not bend, and drilling is done by whatever means is at hand.

This method is still adhered to in the aircraft plants. Only here there are drill presses with movable arms reaching several feet along the sheet. The clamping

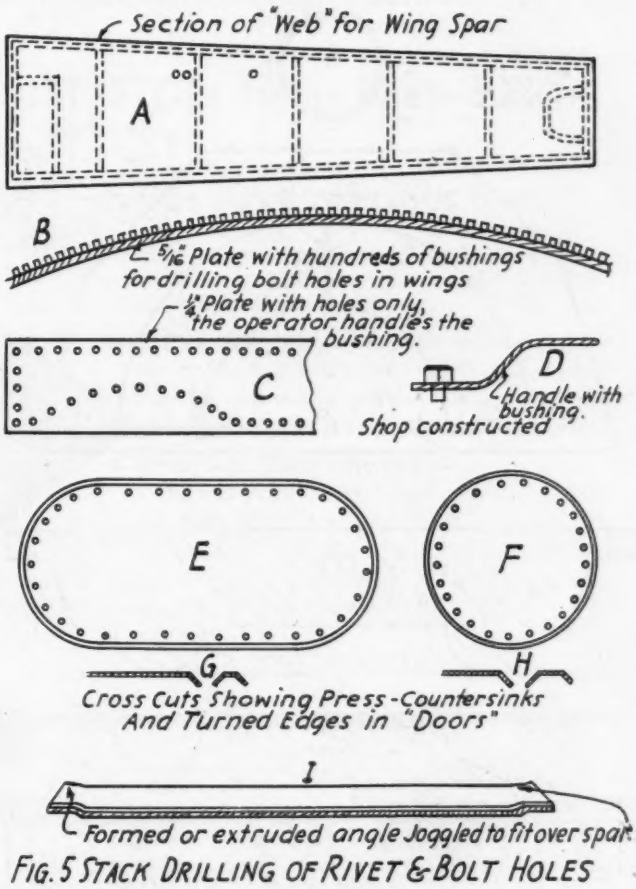


FIG. 5 STACK DRILLING OF RIVET & BOLT HOLES

down of the sheets to a plank is a wise precaution, because if the sheets are longer than is the drill press arm and must be moved on the bench, the plank will hold the sheets in position. Another way of stack-drilling is illustrated under (C) and (D); the template is provided with large enough holes admitting the foot of a bushing. The bushing is held in a handle, inserted into the holes one by one as the operator proceeds. Under (B) is shown a heavy gauge steel plate provided with bushings, such drill-plates being used for drilling holes in the assembled wing or fuselage.

Under (E) and (F) are shown sheet metal parts called "doors." They are covers, bolted unto the fuselage or wing skin, over what might be called "manholes" for reaching into the interior of the structure. These two parts are shown here to illustrate what the hydro-press will not accomplish. First, as shown under GH, there is a 30 degree upturned border. The metal being ST, only a trace of the upturn will show after repeated operation of the press. In a still more pronounced degree the inability of the hydro-press to do forming with only a small area of pressure available for the critical space, is shown in the "dimpling" or, press-countersinking for flat headed screws in the two doors. Even if SO material were used for these doors, the rubber, notwithstanding the 17,000 ton capacity of the press would not do more than just "mark" the countersinks. Piercing-countersinking of the ST material will result in the metal cracking in the extruded portion. This is another job for the manual worker, doing the dimpling, with a properly shaped punch, in a lead block, each time in a different place of the lead.

Under (I) is shown a "stiffener," used in the above

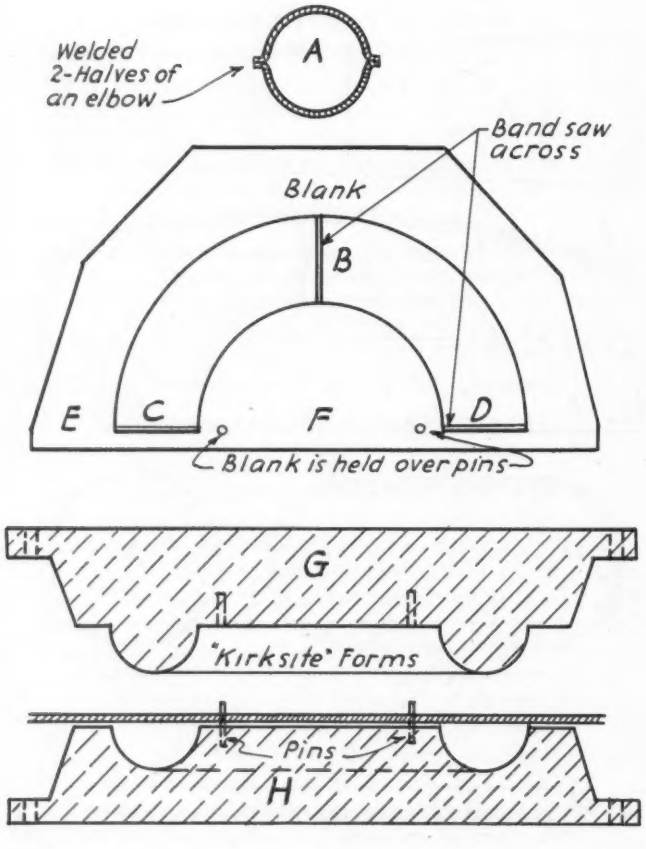


FIG. 6 DROP HAMMER FORMING

web; the part is made of extruded angle, hardened in the proceses of extruding it in the machine. These "joggles" are another of the sores confronting the aircrafter. The metal in the 90-degree sharp angle will not be easily compressed in the hardened material. It either bulges out to the side or it cracks. Only an ingenuously designed tool, a die that will hold the metal from bulging out to the side and hit the metal in the corner by a sharp blow will produce satisfactory results.

Drop Hammer Forming

Roughly illustrated under Group 6 is work that can be best done in a drop hammer. The two halves of the elbow (A), formed of SO material (because welded afterwards and welding would impair the hardness anyway), could be formed in the rubber. But the rubber would leave the flanges flaring out (as shown in the drawing), and that is not wanted. In order to produce the flanges meeting, formation must be done, over a kirksite or cast steel block, in the drop hammer. Any heavy gauge formature especially where pronounced contours are wanted, should be done in the drop hammer. For instance, reinforcing beads in .064 or heavier, beads not more than 1 inch wide, must be done in drop hammer if we want a depth over ¼ inch. Narrower beads or such similar formations are a useless experiment in the rubber pad.

Usually, two halves of an identical part are formed at one time. The form has provisions, shown in BCD, for marking the formed part where it terminates and is cut off. Considerable waste of material accompanies drop hammer forming. The blank is cut much larger to provide equal feeding of the sheet. The surplus metal is sheared off after the part is formed. Several operations of the hammer are necessary in any forming. As shown by (H), the sheet is inserted over pins, holding it in position. (This is not absolutely necessary, but the pins prevent the sheet from changing position under the repeated blows of the hammer). The first hammer blow will bend the sheet downward in the corners adjoining the pins, and bend the metal upwards towards the edges of the blank. Subsequent descent of the hammer will form the "trough," but the corners will be unpronounced. The operator must remove the blank, clean the forms, oil them, and then come down again, hammering the flanging out portions of the metal into shape. Drop hammer operation is a costly one. Dies must be recast frequently. Blanks must be sheared to the right size and shape. And unless there is a great quantity of similar parts wanted, the mounting of the forms is not warranted.

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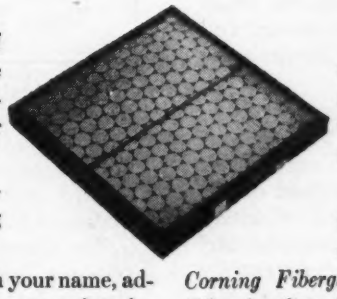
Part 3 of this series will appear in the March issue and will cover typical jobs for (a) hydro-press; (b) press brake; and (c) drop hammer. Also, templates (without proper templates done by sheet metal layout men, no plane parts could be fabricated in 90 per cent of the plants). Finally, principal parts needed in "heating" the bomber processed through blanking, provisioning, forming and joining operations in the January issue.

Here's a shortage riddle you can solve

If the shortage of merchandise, materials, and help has got you tearing your hair , you can still look forward to a nice profit this year with DUST-STOP* AIR FILTERS.

This is because national magagine advertising has already paved the way for DUST-STOP business. It has told the owners of forced-warm-air furnaces in your vicinity how the replacement of clogged filters with clean new DUST-STOPs helps keep their furnaces operating efficiently —helps save precious fuel.

So now the thing to do is to identify yourself as the local Dust-Stop dealer. And to make that easy, Dust-Stops furnish you with the biggest free set of dealer helps in the air-filter business.



You get free counter and window display material with a manual of instructions illustrating effective exhibit ideas.

You get free, attractive folders imprinted with your name, address, and telephone number . . . free ad mats . . . scripts for radio spots . . . follow-up post cards . . . furnace reminder labels.

Plus these things, you get a catalog of filter sizes which tells how many Dust-Stops and what sizes are required by most any domestic forced-warm-air furnace. It enables you to take orders for Dust-Stops over the phone.

Your Dust-Stop distributor knows about this free sales plan. It's called "Pulling Profits out of the Air." Ask him about it today. *Owens-Corning Fiberglas Corporation, Toledo 1, Ohio. In Canada, Fiberglas Canada, Ltd., Oshawa, Ontario.*

FIBERGLAS* DUSTOP* AIR FILTERS

*T. M. Reg. U. S. Pat. Off.

Indiana's Remarkable Convention Highlights Post-War Planning

THE 1944 convention of the Sheet Metal and Warm Air Heating Contractors' Association of Indiana, held February 1 (no convention was held in 1943) provided a real target at which other state associations may shoot this year—there were almost 200 contractors, guests and representatives registered at the meeting. Into one day the program committee crowded practically the entire field of post-war planning and post-war problems. The business meeting for members of the association was held during and following a dinner the night before the convention. This proved quite practicable.

Carter—Post War Activities

Leading off the discussions in post-war problems E. C. Carter, editor of *Snips*, pointed out a number of things which various associations and groups are doing to lay the foundation for a prosperous post-war. An interesting example is the work of local Chicago associations and groups endeavoring to obtain from WPB some revision of Order L-280 which now controls furnace blowers to transfer furnace blowers from L-280 back to the warm air heating section of WPB and to obtain release of blowers as fuel saving devices on gravity furnaces. Our report of Order L-79 in this issue may shed some additional light on this problem. For those contractors who are discouraged enough to consider selling out at this time, Mr. Carter suggested that the post-war business volume appears to be so large that any contractor who has pulled through so far should make every effort to continue in business until conditions return to normal. Our industry is also needed (even though we are small employers) to give work to the millions of returning soldiers and sailors. Mr. Carter also pointed out that no one man today can hope to accomplish anything in Washington or with Washington agencies—this is a proposition of pressure groups and industry action and, accordingly, every effort should be made by local and state associations to remain strong and aggressive during the present period and through the post-war era.

Priorities—New and Old

The very difficult subject of priority regulations was handled by Herman W. Schmidt, president of the Furmets, and priority specialist for W. J. Holliday & Co. Since most of the information extended by Mr. Schmidt has appeared in recent issues of AMERICAN ARTISAN his various discussions will be briefed. Mr. Schmidt pointed out that sheet metal and furnace shops are classified as "repair shops," for the purchase of machines or tools or equipment to be used in the contractor's *own shop* and, accordingly, are entitled to use AA-1 priority rating for the purchase of drills, tools, machines, up to $500 total in one calendar year. This equipment cannot be sold, but must be used in the contractor's shop.

Mr. Schmidt pointed out that P-84 is now revoked and its place is taken by L-79 which extends an automatic AA-3 rating for furnaces and furnace repair parts on a customer's simple certification. For the purpose of purchasing sheets, contractors should now use CMP-9-a, also an AA-3 priority rating. This problem of using L-79 and CMP-9-a is covered in this issue.

As reported in AMERICAN ARTISAN, on sheets, contractors should use CMP-9-a for sheets to be used in a specific job, but use CMP-4 to stock sheets and for repair work using sheets from stock. Contractors may not use CMP-4 and CMP-9-a simultaneously for the same job.

Air Conditioning—Whose Baby

A. F. Frazee, merchandising manager of the Dowagiac Steel Furnace Company, discussing air conditioning and the warm air heating contractor in the post-war era said "It is fitting that the industry plan now what we propose to do post-war in order that our industry may sustain high levels of employment and good wages in the production of long-deferred civilian needs. Mr. Frazee pointed out that the industry is already well supplied with adequately designed and dependable equipment and contractors must discount heavily many of the fantastic claims about new gadgets which will accomplish wonders with practically nothing in the way of equipment. Installation of heating equipment, however, can be considerably improved and we will no doubt have trends toward standardization, less-expensive equipment and installation.

The warm air heating contractor is the logical distributor for air conditioning equipment, since he is already established in business, knows the limitations of the equipment he handles, and has proved his capacity to properly install and service this equipment. The most serious competition to be expected, in the opinion of Mr. Frazee, is the appliance dealer who is a trained merchandiser, is usually well financed, has had previous contact with a large clientele, and has the support of the large utilities and big-name organizations. The warm air heating contractor, however, has certain distinctive advantages—thoroughly tested lines of equipment; good installation department; good service department. Two things contractors must do,

OFFICERS

President—Frank G. Sink, Indianapolis
1st V. Pres.—James R. Walker, South Bend
2nd V. Pres.—H. W. Meggs, New Castle
Treasurer—Tom Ewing, Huntington
Secretary—Homer Selch, Indianapolis

Directors

One Year—Carl Butz, Lafayette
One Year—E. L. Carr, Indianapolis
Two Years—Chas. Gatz, Gary
Two Years—C. C. Seib, Fort Wayne
Three Years—Elmer Livezey, New Castle
Three Years—Louis Lehnen, Lafayette

however, is to consider consistent and aggressive advertising post-war and take steps to properly train sales engineers for correct installation and design practice.

Post War Building

R. A. Dadisman of American Rolling Mill Company presented a very interesting discussion on post-war construction anticipation, but, unfortunately, used some data which cannot be published. Mr. Dadisman pointed out, by the use of charts, how following the war of 1812 there was a rather lengthy period of depression and a fairly long period of recovery; after the Civil War, there was a shorter depression and a longer period of recovery; and following the first World War a still shorter period of depression, then a recovery, then a depression and then a long period of prosperity. Mr. Dadisman did not claim that post-war we will have a continuation of this trend, but it is worth consideration.

To the advantage of post-war construction, we now are accumulating tremendous reserves of money and we are piling up an enormous civilian need for durable goods. Our accumulated savings and bonds now total almost sixty billions and in another year we may reach the tremendous total of a hundred billion dollars of savings. At the same time installment credit has fallen off 75 per cent, so civilians will not enter the post-war period greatly in debt.

Surveys of potential post-war building construction, vary widely, ranging from 300,000 new family dwelling units to 1½ million new family dwelling units per year. What figures we may accept is open to question, but we can be sure, said Mr. Dadisman, that there are more people now who want a home than ever before. Probably this is due to the fact that people have accumulated savings and can now see a possibility to build or buy a home. In addition, surveys generally indicate that from 35 to 50 per cent of present home owners intend to do extensive repair and modernization work post-war. Armco's projection indicates perhaps 800,000 to 900,000 new heating plants a year on an average, during a period extending seven to ten years beyond the end of the war. New commercial construction looks large and industrial construction may be very large if, as now anticipated, reconstruction and reconversion necessitate major changes in industrial plants from war work to civilian production.

One problem faces all industry and business, whether large or small, pointed out the speaker, and this problem is the necessity for employing some 55 million workers at wages which will total at least 100 billion dollars a year. One hundred billion dollars net income means at least a gross of 140 billion dollars of earned income. This is much larger than anything we have ever enjoyed in peace times. If industry and business cannot furnish this employment and this income, then the chances are that government will have to take over to some degree; the degree depending upon how far short of this goal industry and business falls.

What Contractors Can Do

Mr. Dadisman finished his interesting discussion by outlining fifteen things which the sheet metal and warm air heating contractor may do now to put his house in order for post-war work. These are:

1. Be sure all plans are broken down into specific work items.
2. Contact local offices of Committee for Economic Development and Chamber of Commerce.
3. Look at the fabricating and installation savings made possible by modern equipment.
4. Consider new lines of equipment which may have sales possibilities.
5. Select a jobber who offers the best in service.
6. Convert shops to stores and be sure that the store is so arranged that it will assist in selling merchandise.
7. Make show windows earn their way.
8. Make the shop as efficient as possible.
9. Reconstruct inventory to eliminate slow moving items and concentrate on items which are fast moving and profitable.
10. Set a definite sales goal by years or quarters and by lines of equipment or work.
11. Canvass all local industrial plants and attempt to establish yourself as a reliable contractor to do repair, maintenance and reconversion construction.
12. Brush up on all engineering and eliminate expensive engineering and be sure that your force is able to design and install according to modern practices.
13. Give consideration to some form of incentive payment in order to increase the efficiency of individual workers.
14. Revise bookkeeping methods so that bookkeeping and reporting (see January AMERICAN ARTISAN) will insure reports at the proper time and elimination of all costly production which does not return a profit.
15. Revise the cost accounting methods so that definite costs can be established on all shop and sales force activities.

New National Ass'n

R. A. Guenther, Chicago, Director in the new national association for sheet metal contractors reported that the proposed meeting for the month of January in Chicago has been postponed until April 27 and 28 and the convention will probably be held in the LaSalle Hotel. Mr. Guenther also pointed out that association committee's are already working on problems which will assist the industry now and in the post-war period; for example, obtaining permission to install package blower units as a fuel-conservation measure.

New Forms of Heating

Professor William Miller from Purdue University, discussing new types of heating based upon data obtained in Purdue University Research Foundation said that radiant heating looks interesting, and seems to be a type of heating which home owners are going to investigate thoroughly post-war. However, radiant heating still has many problems. While radiant or panel heating does meet satisfactorily certain basic heating principles because it reduces bodily heat loss to cold surfaces, we still must remember that all radiant heat travels in a straight line from the surface losing heat to the surface absorbing heat and these heat rays cannot be bent around corners and we do not have too much data on just how large a panel is necessary for comfort indoors. Neither do we have sufficient data on temperature requirements in the panel, or air temperatures required for comfort, and numerous other obstacles.

(*Continued on page* 104)

NATIONAL WARM AIR HEATING AND AIR CONDITIONING ASSOCIATION Says

Never Before Such an Opportunity for Dealers

SHALL we talk about your prospect list of new and old customers? Or haven't you got a prospect list file?

Unlike many durable civilian goods industries such as automatic refrigerators, washing machines, vacuum cleaners and others, the warm air heating industry has been permitted to produce its products in a limited way for the essential civilian repair and replacement market in addition to requirements for war housing and other governmental needs. The effect of necessary governmental war time control has been to reduce the volume of the business of the industry to the open but very limited depression market which existed in the early thirties.

In other words, the warm air heating industry is now in the depths of a depression but at a time of the greatest national income and labor shortage on record. Well, what does all this add up to?

In that first depression in the early thirties, probably all you needed to enjoy a more voluminous and profitable business would have been a customer prospect list about twice as large as the one you had. But it wasn't in the cards and there was no prime on the pump. You would have been happy to have paid a substantial sum of money for a good prospect list. But whether you had the money or not, the names of good prospects were limited and we all knew that unless the economics of the country improved, business would have to continue on the basis of *PROSPECTS LIMITED.*

Prospects Unlimited

We are in a period now of PROSPECTS UNLIMITED and on the threshold of the greatest opportunity for business volume and reasonable profits which the warm air heating industry has ever witnessed. However, if warm air heating dealers and contractors of the United States and Canada are going to enjoy this great volume and profit, each and every one should build a customer prospect list file. A complete prospect list file can be your greatest contribution to postwar planning. Forgetting the profit motive, it is your patriotic duty to maintain a file so that directly you can assume your responsibility for re-employment and through greater volume aiding re-employment of the business organizations which serve you.

Prospect files, as we know, are nothing new. But they do one thing well if properly kept up in a methodical way, which we ourselves cannot do. They are our "memory system" and as such are really the first point of attack in the world of sales promotion, merchandising and finally sales. I am sure you will find that a properly executed file will add not only volume and profit to your business but its very existence and operation will place you and your business on a more dignified plane.

By comparison, a prospect file can prove as profitable as buying stocks at the bottom of a bull market and selling them at the top. The difference, however, is that you control your business and files but you cannot control the stock market.

Heating Consciousness

Because of the war and the necessity for fuel conservation, people today are heating conscious which they were not, just a few years ago. Prospects in the post war period are almost unlimited for equipping present warm air systems with automatic temperature controls and humidifiers. The replacement market looms large, to replace existing furnaces, which are or will be worn out, with automatically controlled temperature systems, and completely automatic forced warm air heating systems with temperature, humidity and air filtering control. And in addition, there will be a large number of home owners who have satisfactory gravity warm air systems, who will want to change to winter air conditioning or all year 'round air conditioning. And finally, according to all present estimates, the new house market will be of amazing proportions.

Direct Mail

A good customer prospect file won't be worth the time it takes to make it up unless you use it. Yes, you will want to make personal contacts when the proper time arrives, but in the meantime you want to work on your prospects through a "direct mail follow-up" and where possible with a background of newspaper display advertising.

Unless warm air heating dealers and contractors adopt aggressive promotional sales plans, many of the rosy customer prospects of yesterday, will probably say "We have just purchased one of those new superduper zerofreezers" or what have you! Your competitors in other lines will cut under you if you let them.

Will your sources of supply assist you in developing an outstanding "sales promotional plan"? My guess is a thousand times yes and particularly so in the period we are approaching of *PROSPECTS UNLIMITED.*

Geo. Boeddener,
Managing Director.

ASSOCIATION Activities

Michigan

The Michigan Sheet Metal, Roofing, Heating and Air Conditioning Contractors' Association will hold their 33rd annual convention on March 2, 3 and 4, 1944, at the Occidental Hotel, Muskegon.

The association deeply regrets the passing of their first full term president—Joseph Van Rossum of Grand Rapids—and extends the sympathy of the association to the family. Mr. Van Rossum was one of the founders and a very active member.

Starting in February, every Bulletin will be on or in a printed cover which will carry the names of all advertisers and the Auxiliary. These bulletins go out once or more a month to all members and will now go also to advertisers and the Auxiliary.

Members are asked to make every effort to buy their requirements from those who are supporting and assisting the association.

To the Auxiliary, the association expresses sincere appreciation for the fine cooperation given in the past and asks for far greater cooperation in the future. The association asks the Auxiliary to do their best to get every sheet metal shop, every roofing outfit and every furnace contractor in the State as a member of this association. The association can not control the purchases of members, but they can and will continue to ask that they give the limit of cooperation.

Letters have been sent out to over 250 firms located in or about this territory. In one week, we received orders for seven pages of advertising—some from new advertisers. Ask every salesman calling on you if his firm has taken space in the program, and if not, ask him to call this to the attention of his company. All advertisers and all Auxiliary members will be mentioned in every bulletin sent out after February 1st and all during the year. They will also receive copies of all regular bulletins.

Sales Tax

Because of the recent ruling of the Michigan Supreme Court, the contractor is a retailer and therefore liable for the sales tax. In construction, the party having the work done is the purchaser and the last party to sell the purchaser is considered the retailer. The party having the contractural arrangement with the final purchaser, usually the owner, whether general or subcontractor, is liable for the tax. In the changeover from the present to the new system, the contractor or subcontractor is to continue paying the tax to his source of supply until such time as he gets his tax license, then in remitting to the state, he may deduct the sales tax paid to the wholesaler. More complete details are available from N. J. Biddle. Proper records are absolutely necessary.

The Association wishes a happy and prosperous New Year to all members, to the Auxiliary and friends of the industry.

N. J. Biddle, Secretary.

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The Carolinas

The Carolinas Roofing and Sheet Metal Contractors Association, started last May, held their convention on December 8 and 9 at the Barringer Hotel, Charlotte, N. C.

A meeting of the directors was held on December 8, with President Gordon Waters, Secretary Victor King, Vice-president T. W. Young, and the following directors present:

L. K. Flynt, V. D. Ramseur, W. T. Fort, Ralph C. Barker.

J. A. Piper, a director of the United Roofing Contractors Association, was invited to sit in. Strictly a business session, the time was devoted to going over the accomplishments of the past six months, and in setting up the order of business for the convention.

The association publishes the "Carolina Roofer" which goes into the hands of the roofers in the Carolinas whether members or not, to the general contractors and to the architects.

Benefits from the organization mentioned were the reuse of steel containers, and Victory solder—30-70—allowed.

The association decided at the convention to have Secretary-Treasurer King issue a monthly Service Bulletin, to be mailed to members only.

An unfair contract proposal sent out by a railroad was discussed and it was decided to ask the railroad to consider changing the proposal form and eliminate the objectionable paragraphs. Copies of the resolution were to be mailed to the United Roofing Contractors Association and the Sheet Metal Contractors National Association.

A Post-War Planning Committee, composed of J. A. Piper, L. K. Flynt, and Mr. Baker of Baker & Rawls, was appointed.

Membership just outside the Carolinas was discussed and referred to the membership committee.

The Secretary was instructed to investigate Compensation Insurance rates and learn why Georgia pays $5.56, North Carolina $6.18 and South Carolina $8.272.

President Gordon Waters and Secretary-Treasurer King were elected delegates to the United Roofing Contractors Association and the Sheet Metal Contractors National Association with $75 expenses for each delegate to be paid by the association to help out on the expenses of the trip. Joe Piper was elected an alternate.

Five new members were added, making a total of 30. The meeting had 25 members' and 12 manufacturers' representatives present.

Following luncheon, the group discussed metal edging for asbestos ducts, vermiculite slab deck, poured vermiculite, foam glass insulation, and other items along our regular line of work.

◆

First Michigan President Passes

Joseph Van Rossum, 310 Lafayette N.E., Grand Rapids, Michigan, died December 19, at the age of 69 years. Mr. Van Rossum was the first president of the Michigan Sheet Metal & Roofing Contractors' Association, elected at the annual convention in 1912. The organization was formed the preceding year with temporary officers elected to serve until the convention.

Joe started in the plumbing business at the age of 13 when he was apprenticed to the Schuefler Plumbing Company. He started his own plumbing, sheet metal and roofing company in 1893 and continued actively in the business until about two years ago when he was forced to retire because of ill health.

Surviving are Mrs. Van Rossum, a daughter, a stepson—George Tange, a stepdaughter, and two sons—Arthur A. and Peter J.

Pallbearers were P. O. Wierenga and H. F. Cox from the sheet metal industry, and John Petersen, Stanley Merdzinski, Henry Struhs and Peter Pipe from the plumbing industry.

Association Activities . . .

More Items on page 108

St. Louis

The Associated Sheet Metal, Air Conditioning and Warm Air Heating Association of St. Louis, Inc., met in December and re-elected the following officers:

President—Harry Wright
Vice President—Anthony A. Cuneo
Treasurer—Ben Kolbenschlag
Secretary—Wallace Cavallo
Sergeant-at-Arms—M. Hartmann

This association has joined the new National organization.

St. Louis is now pressing for a code for the installation of warm air heating systems.

Postwar plans have received much attention and many solutions have been offered.

Ben Kolbenschlag has been appointed as chairman of the architectural and general metal work committee and a member of the membership committee of the new National.

Several out-of-state shop owners, interested in the new Sheet Metal Contractors' National Association, wish to join the St. Louis group.

◆

Master Association—Chicago

The Master Furnace and Sheet Metal Association of Chicago met on December 15th and elected the following officers:

President—Arthur L. Nelson
Vice President—Elmer Brodeen
Treasurer—William Kirby
Secretary—John Titterington

Directors for the coming year are Paul Barth, William Kirby and the retiring president, Floyd Townsend.

At the January 19 meeting at Sportsman's Hall, 7435 S. Cottage Grove Avenue, these officers were officially installed by Roy Mahlberg.

The officers are planning an educational program for the coming year.

John Titterington, Secy.

◆

Saginaw Valley, Michigan

The Saginaw Valley Sheet Metal, Roofing, Heating and Air Conditioning Contractors Association held their first annual party at the Old Heidelberg Garden on February 2, 1944, with an attendance of 151. Chicken dinner was served.

Ernie Simmons acted as master of ceremonies and introduced a few of the guests. The Committee for the annual party consisted of George La Rouche, Arthur Lange, Marshall Vallette and Elmer Lewless.

Out-of-town guests were State Secretary N. Jay Biddle, Jim Morressy, Ed. Wilson (Asbestos Man), and Past State Association President Andrew Lewless. After dinner favors were passed around and there was singing and warbling while the tables were cleared for dancing. The orchestra played the type of music the sheet metal and roofing contractors could jitterbug to. Friend Frank Herzberg kept the bottle under the table instead of on top. Al Wiggins family took most of the prizes. The party broke up about 1:30 o'clock. Ed. Wilson has pictures of the party.

Officers of the association are

President—Floyd McCoy
Vice President—A. C. Klopf
Secretary-Treasurer—Alfred M. Klopf

Alfred M. Klopf, Secretary.
802 Hoyt Ave., Saginaw.

◆

Muskegon, Michigan

The Michigan State convention arrangements are being handled by H. Vander Woude, president of the State association, and John Bos, president of the Muskegon local. They are being assisted by Harry E. Gibson of the Gibson Sheet Metal Works, 639 West Clay Avenue, Muskegon 5. Mr. Gibson is a past president of the local association. The local officers are

President—John Bos Sheet Metal Works
Vice President—Lyle Latten, Muskegon Heights Sheet Metal Co.
Treasurer—John Stulp, Stulp Stove Repair Co.
Secretary—H. Vander Woude, Mueller Heating Co.

Other members of the local group are:

Fred Smith, Muskegon Sheet Metal Works
Gale Lofgren, Lofgren Sheet Metal Works
Herman Bauer, Bauer Sheet Metal Works
Harry E. Gibson, Gibson Sheet Metal Works
William Hall, Hall Furnace Cleaning and Repairing
B. Richards, Richards Plumbing & Heating Co.
Harry Woodard, Muskegon Roofing Co.
Prinz Bros., Home Furnace Co.
Harold Boor, Holland Furnace Co.
L. Moore, Moore Furnace Co.

◆

Cook County—Illinois

The Sheet Metal Contractors' Association of Cook County held its regular annual meeting and election of officers at the Atlantic Hotel on December 14, 1943. Dinner was served at 6:30 and the business meeting followed.

All officers were reelected for another year:

President, Wm. Perkinson.
Vice President, Richard Robinson.
Secretary, G. P. Myers.
Treasurer, Albert J. Wagner, Jr.

◆

Annual Forced Warm Air Conference

This year's 13th Annual Forced Warm Air Conference will be held at Michigan State College, East Lansing, Michigan, beginning March 20th through the afternoon of Thursday, March 23rd. Registration for the conference will be between 9 and 10 A.M. All manufacturers, jobbers and dealers connected with the warm air heating industry are urged to send at least one representative. The program this year is unusually complete and will provide information which otherwise would take years to accumulate.

We urge everyone who plans to attend the conference to immediately write to *Prof. Lorin G. Miller, Michigan State College, East Lansing, Mich.*, so that the college will know how many men should be provided for. Under present conditions, it is very necessary that the college have this information to provide for necessary food and room facilities. Rooms and meals will be available at reasonable cost but at this writing, no definite announcement can be made.

There are so many important features on this program that it is very difficult to pick out one particular feature of the program as compared to another. However, we believe one of the most important subjects to be presented will be the design of a forced warm air system using the new forced warm air heating manual which is now being developed by Professor S. Konzo, Guy Voorhees, the Installation Codes and Research Advisory Committee of the National Warm Air Heating & Air Conditioning Association.

We are listing below the subjects which will be presented at the 13th Annual Forced Warm Air Conference.

Heat Loss Through Building Construction
Human Comfort as Affected by Building Construction
Presentation of the Design Problem
Calculation of Heat Loss by Conduction
Infiltration and Its Effect Upon Comfort
Calculation of Heat Loss by Infiltration
Round Table Discussion
Cfm Requirements, Cfm Factor. Determination of air quantities for each room in the house
Location and size of grilles and registers
Friction loss in ducts and fittings
Layout and design of warm air and return air ducts
Design of a gravity system for the problem house
Design of a Forced Warm Air System with new manual
Comparison with technical code system
Banquet—Wednesday, March 22nd
Comparison of System Characteristics with Fan Characteristics—Selection of Fan for Problem House
Design of a filter system small home heating plant
What a control system should do for a forced warm air system
A comparison of some of the common types of controls.

NEW PRODUCTS

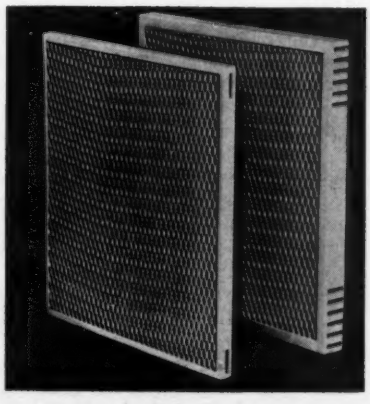
For your convenience a number has been assigned to each item. Circle the items in which you are interested on the coupon on page 87 and mail to us.

△ Indicates manufacturer not listed in 1942 Directory.
● Indicates product not listed in 1942 Directory.

1—All Steel Filters

Air Devices, Inc., 17 East 42nd St., New York 17, announces three new impingement type filters with special expanded-metal filter mesh design. The filters can be removed, cleaned and recharged. Vents in frame aid in cleaning and draining.

The Badger air filter, available in 1 and 2 in. thicknesses, and many sizes



ranging from 100 to 600 sq. in., is specially designed for ventilation and air conditioning service and other applications where high efficiency, large dust holding capacity, and low static pressures are required. Fire hazard is eliminated. Frames are sturdy, arc-welded, and with handles if desired.

The Permo-Aire filter, recommended for extra heavy duty and industrial air cleaning services, is supplied in 2 and 4 in. thickness with areas from 100 to 1200 sq. in.

The Permo-Aire Grease Filter for safe kitchen and galley ventilation, efficiently removes grease from kitchen fumes, avoids danger of grease fires, protects mechanical equipment and insures better sanitation.

Filter Holding Frames, with "Slip-Groove" assembly and spring locking features for savings in assembly and cleaning time, are available in many standard sizes and shapes.

◆

2—AC-DC Electrode

The Lincoln Electric Company, Cleveland, announces a new general purpose arc welding electrode for welding mild steel in all positions, either alternating or direct current.

The ability of "Fleetweld 37" to withstand higher currents, both alternating and direct, makes possible higher welding speeds than normal and its easy handling characteristics in all positions make it an ideal electrode for general purpose work. The fact that with proper currents it will neither stick to the work nor burn through makes the electrode especially desirable for light gauge welding.

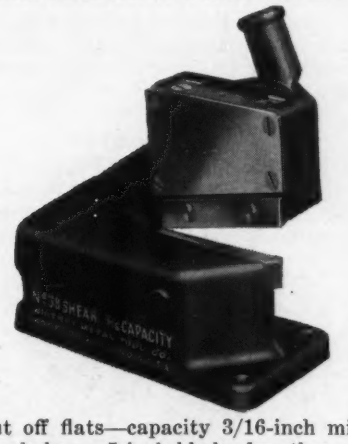
"Fleetweld 37" is available in the 1/8, 5/32 and 3/16 in. sizes in 14 inch lengths and is packed in 50 pound standard container.

◆

• 3—Shears

Whitney Metal Tool Company, 110 Forbes St., Rockford, Illinois, offers two new Whitney-Jensen shears.

The Whitney-Jensen throatless bench shear No. 38 will slit sheets and



cut off flats—capacity 3/16-inch mild steel; has a 5-inch blade; length overall, 11 inches; height overall, 8¾ inches; width overall, 7½ inches; net weight, 45 lbs.

The Whitney-Jensen ball bearing double cut angle iron shear No. 162

operates in the same manner as the ball bearing screw action punches. All sizes of angles through 3x3x¼-inch can be cut by one man without distortion of either leg of angle iron.

4—Splash Proof Motor

Century Electric Company, St. Louis 3, announces Century Form J Splash Proof motors in sizes 1½ to 15 horse power, available with two-way ventilation.

The cooling air is drawn in through baffled openings in the bottom of the

end brackets by a fan on each end of the rotor, blown through and around into all parts of the motor; and out through louvred openings in the side of the frame below the center line and at the bottom.

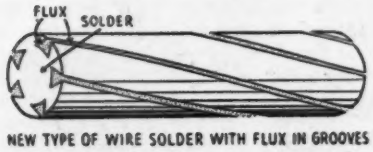
This construction protects the vital parts of the motor during plant wash down or for outdoor operation.

◆

• 5—Fluxrite

National Lead Company, Room 1815, 111 Broadway, New York 6, has just placed on the market a new type of fluxed wire solder, called Fluxrite, which contains flux in longitudinal grooves on the surface rather than in the conventional core.

Since the flux in the new product is



NEW TYPE OF WIRE SOLDER WITH FLUX IN GROOVES

outside rather than inside, it liquefies and flows onto the work before the solder melts. Since there is more than one flux-filled groove, there is naturally a continuous flow.

An additional advantage is that the flux supply being outside the wire, is always visible to the user.

The new product, which contains a recently developed special flux, comes in the same diameters as regular cored solder. It is available in two compositions designated as Red Stripe and Green Stripe. These designations refer to the color of the flux which has been specially dyed in each case for easy identification.

New Products . . . . . .

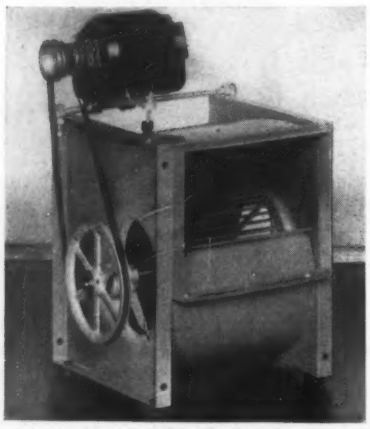
For your convenience in obtaining information regarding these items, use coupon on page 87.

• 6—4-Way Blowers

Trade-Wind Motorfans, Inc., 5725 South Main Street, Los Angeles, manufacturer of air moving equipment, announces a complete new line of "Quad" 4-way interchangeable blowers.

This new series is the culmination of 5 years of pioneering the 4-way interchangeable blower design and incorporates such features as unit welded steel construction, streamlined inlet, fittings, handy motor mount balanced blower wheel and adjustable bearing oiler. Wheel diameter sizes range from 6 to 25 inches.

Its design uses a new style of



blower housing that acts as the frame and is unusually rugged and weave-free. This is accomplished by the welding of a heavy scroll sheet between two end plates thus forming a beam inside of which the balanced blower wheel is installed. The blower may be driven from either right or left and a new type motor mount permits the driving motor to be quickly attached on the job to the top, rear or front of blower frame. The bearing oiler can also be moved so that oiling cup is upright and accessible.

The streamlined inlet is die stamped in each side of the blower, assuring quiet, efficient operation. All models are provided with cushioned feet attachable to any of the four positions.

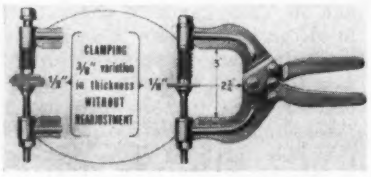
◆

• 7—Toggle Clamp

The Detroit Stamping Company, 341 Midland Ave., Detroit 3, announces the addition of a new portable toggle clamp to its line of De-Sta-Co products. This clamp, known as De-Sta-Co Clamp No. 470, with Pressure-Matic feature, is for use on sheet metal and other work where the individual parts to be clamped vary in thickness, up to ⅝ inch on various locations of the same fixture group.

The spring fitted onto one of the adjustment spindles provides for this ⅜ in. variation without readjustment of spindle.

Also the three-inch wide throat of this new clamp provides capacity to handle a much greater than average range of work and thereby further increase its usefulness. The improved



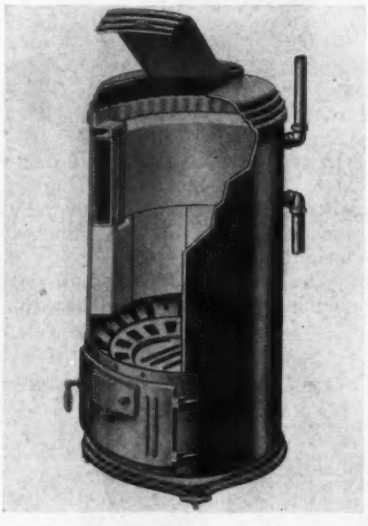
swivel foot permits clamping angles and other odd shapes securely. May be used for clamping metal, wood or plastic parts, for riveting, welding, gluing or other operations.

This portable clamp has a thumb screw adjustment by which the gap may be set for thickness of work to be clamped. Holding spindles and nuts are copper plated to prevent damage from welding spatter. When closed the clamp automatically locks into position until manually released; will not "walk"; holds firmly and releases instantly.

◆

• 8—Heater

Stiglitz Furnace and Foundry Company, 2007 Portland Ave., Louisville 3, Ky., announces a new semi-automatic coal-fired water heater—the Warm-



Aire—with exclusive air-jet carburetion. One firing will last one or two days, depending on the demand for hot water. With the Air-Jet carburetion, all combustion takes place inside the fire-box.

An especially designed water jacket is located at the top of the firebox, and the magazine holds 75 lb. reserve of coal.

△ 9—Kennametal File

Kennametal Inc., 412 Lloyd Avenue, Latrobe, Pennsylvania, has developed, and is now marketing, a new and revolutionary type of file made of the same hard, high strength cemented carbide compositions as the steel-cutting Kennametal lathe and boring tools. Lathes have been "revved up" to the speeds necessary for efficient, enduring performance of carbide-tipped cutting tools, and the ability to file revolving work pieces without reducing speed is a valuable aid to maintenance of production.

At the present time, Kennametal files are available in one size, the F76. It is 11 in. long, ¾ in. wide, and ⅜ in. thick, having a substantial filing surface 4 in. long, made of grade K4H Kennametal (80.6 Rockwell C), single cut with teeth at 30 deg. shear angle, 40 per inch. Convenient grips for the operator's hands are provided.

◆

△ 10—Plastic Hammers

New Plastic Corporation, 1017 North Sycamore Ave., Los Angeles, is introducing its Nupla line of plastic hammers, utilizing a special, semi-soft plastic. The manufacturers recommend them for metal forming in dural, aluminum, brass, bronze,

etc., as well as for machine shop work, particularly on ground finishes and other fine surfaces.

Nupla plastic hammers are available in seven sizes and seven weights ranging from 5 oz. to 2 lbs., and in two hardness grades. "A" Cryst-O-Flex for general machine work and hardened "B" Cryst-O-Flex for metal forming. Special plastic hammer-head sleeves, which prevent sparking are also available for work with explosive materials.

heat problem:

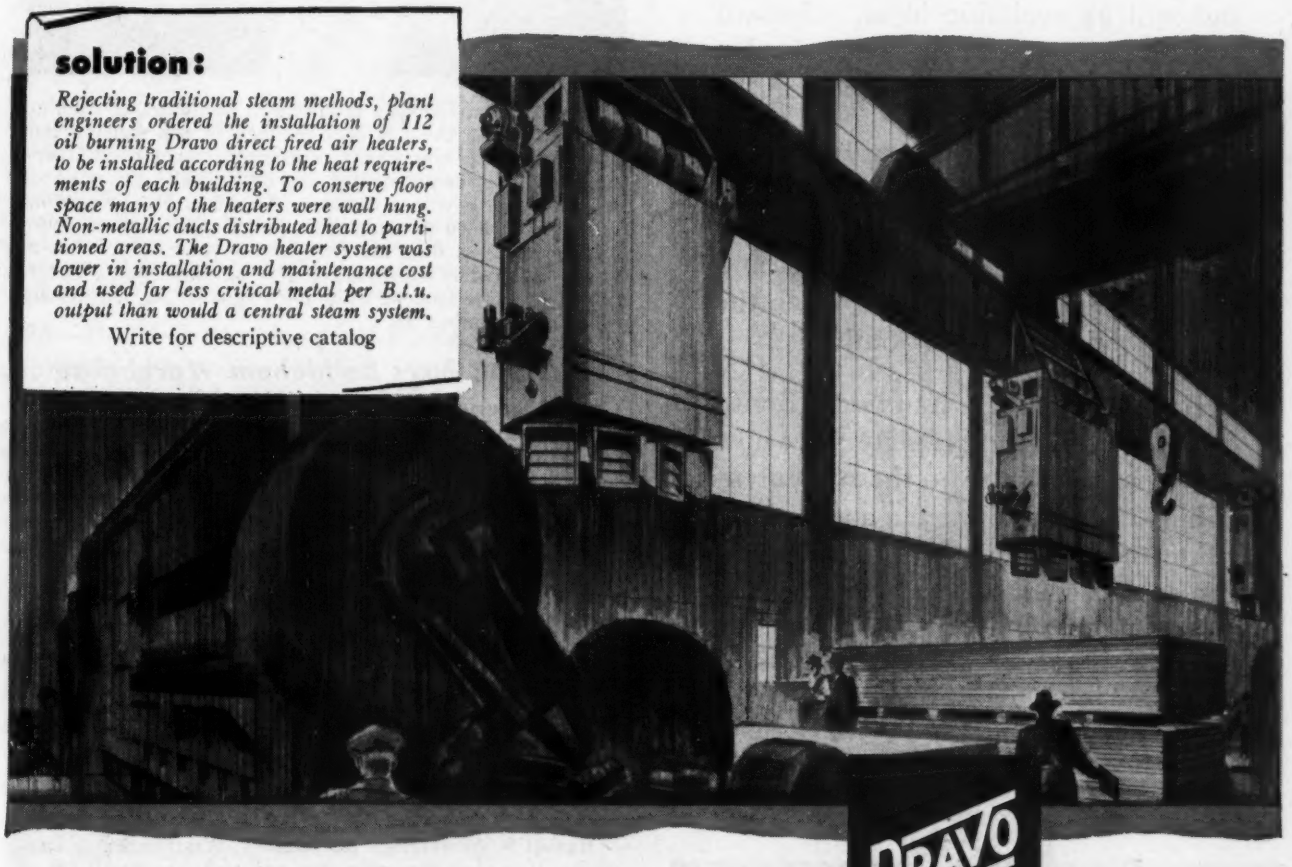
requirements 135,000,000 B.t.u. . . . separate buildings all over town . . . heat this entire plant . . . and quickly . . .

Scattered throughout one of the great industrial centers of America, this group of discarded manufacturing plants was to be revitalized to serve as Defense plants. Dry heat was required to prevent corrosion of sheet metal stock. Floor space was at a premium, making it necessary to plan for future shifting of heaters as space requirements changed. Plant ceilings were high and numerous office sections were involved. The use of a central steam heating plant would involve an excess of critical metal, costly maintenance and installation and too much time to construct.

solution:

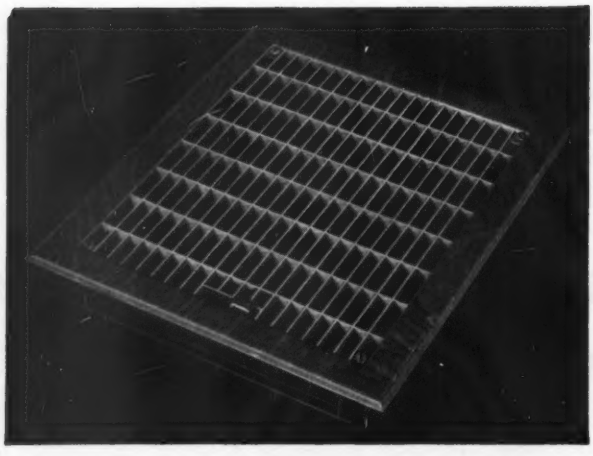
Rejecting traditional steam methods, plant engineers ordered the installation of 112 oil burning Dravo direct fired air heaters, to be installed according to the heat requirements of each building. To conserve floor space many of the heaters were wall hung. Non-metallic ducts distributed heat to partitioned areas. The Dravo heater system was lower in installation and maintenance cost and used far less critical metal per B.t.u. output than would a central steam system.

Write for descriptive catalog



DRAVO CORPORATION · PITTSBURGH

DRAVO Heating



H & C No. 210 "NO-FLEX" Floor Register

"NO-FLEX" AGAIN IN PRODUCTION!

Yes, America's number one Floor Register is now back in production and will be available in all standard sizes (black and oak finishes) shortly after this advertisement appears.

Clean-cut, exceedingly sturdy, attractive and having large free area, the return of this register will be welcomed by that great host of heating men who justifiably regard it as the finest floor register ever built.

Practically all our standard gravity and air conditioning registers are now being manufactured to the full extent of our C.M.P. allotments, and prompt shipment of register orders for essential current needs may be expected.

Catalog No. 42 is current catalog of complete line of Gravity and Air Conditioning Registers and Accessories.

H&C

HART & COOLEY MANUFACTURING CO.

World's Largest Manufacturers of Registers, Grilles, Furnace Accessories

HOLLAND • MICHIGAN

With the Manufacturers

Sedgwick Heads Waterman-Waterbury

The Waterman-Waterbury Company, 1121 Jackson St., N. E., Minneapolis, recently elected the following officers:

President—F. G. Sedgwick
Vice President—Harry G. Cross
Secretary—Paul E. Cross
Treasurer—B. O. Schwarz

J. Henry Cross is now Chairman of the Board.

◆

Sheetlock, Skilsaw and Acme Make a Duct

W. F. Potts & Son Company, 1216-24 Cherry St., Philadelphia, held a sales meeting December 28, 29 and 30, entertaining representatives from the Eastern Seaboard.

On December 28 Forrest R. Groomes of Sheetlock Company, Chicago, talked to Potts' representatives as well as

engineers from Keasbey & Mattison Company of Ambler, Pa., explaining the use of Sheetlock in the construction of ducts. With him was a representative of the Skilsaw company, who demonstrated the cutting and grooving of asbestos boards with a Skilsaw. An Acme Steel representative was there showing strapping, and together these men made up a duct showing how it was done.

The illustration shows a group of salesmen being entertained by Sheetlock at Palumbo's cabaret on Wednesday evening, December 29.

◆

Ryerson Buys Bethlehem Warehouse

On February 1st Joseph T. Ryerson & Son, Inc., purchased from the Bethlehem Steel Company their Pittsburgh steel warehouse plant. The property consists of a large modern warehouse building, containing 150,000 square feet on an industrial site of several acres. The building is equipped with cranes and will readily lend itself to future improvements and expansion. It is located in Carnegie, Pennsylvania, adjacent to Pittsburgh.

Due to limited office facilities at the plant, Ryerson has opened a sales office in the Grant Building, 330 Grant St., Pittsburgh 19, Pennsylvania.

Howard L. Robinson of the Ryerson Cleveland organization, who has served in the Pittsburgh territory for some time, will be located in the Grant Building as the Ryerson Pittsburgh representative. W. W. Kopf of the Ryerson Philadelphia plant, will be located at the plant office.

◆

Coman Joins Winningham

Harold W. Winnigham & Company, Western States Representatives and Engineers for national manufacturers of heating, air conditioning, appliances and general equipment with general offices at 1117 Second Avenue, Seattle 1, Washington, announces the appointment of **Lawrence J. Coman** Southwest District Manager, with headquarters at Los Angeles, California.

Harold W. Winningham, president of the firm also announces the opening of new Southwest District Offices and display rooms at 633 South La Brea, Los Angeles.

New Literature

For your convenience in obtaining copies of new Literature use the coupon on this page.

201—Engineered Ventilation for Industry

The Allen Corporation, 9751 Erwin Ave., Detroit 13, Michigan, is distributing an 8-page catalog on industrial ventilation—roof fans, stack heads, turbine ventilators, exhaust fans, fan sections, "Lo-Noiz-Level" multi-blade fans, "Laminar-Flow" ventilating roof valve, winter supply air make-up unit, automatic shutters, moisture removal, heat removal, fume removal, or dust removal.

◆

202—Direct-Fired Warm Air Heaters

Dravo Corporation, Neville Island 25, Pittsburgh, has prepared a 16-page bulletin describing the Dravo direct-fired warm air heater. Bulletin 509 deals chiefly with the economy of use and installation of Dravo heaters and their flexibility of application. Diagrams showing nine basic designs and giving Btu capacities, dimensions, and specifications on 44 models are shown. Dravo heaters burn anthracite, bituminous or lignite coal; natural, manufactured or coke oven gas; light or heavy oil; or any two of these fuels in combination. Standard sizes range from 50,000 to 8,000,000 Btu per hour capacity.

◆

203—War-Time Tool Maintenance Manual!

Skilsaw, Inc., 5033 Elston Ave., Chicago 30, has just published a new catalog with a big special section entitled "How to Get the Most from Your Portable Electric Tools." Designed as a handy guide to greater production and longer tool life, this War-time maintenance manual is full of illustrations and valuable suggestions on the care and operation of portable electric tools.

This new catalog also carries complete data on and working illustrations of the Skilsaw Portable Electric Tools preferred in war production and construction. Free copies may be obtained by writing the manufacturer.

◆

204—Draft-O-Stat for Fuel-Saving

The Hotstream Heater Company, 8007 Grand Avenue, Cleveland, is distributing a 4-page folder with a letter on the first page to dealers calling their attention to their motorized Draft-O-Stat for fuel saving of 10 to 30 per cent on an automatic coal or oil-burning furnace. The Draft-O-Stat is available to consumers without priority. It may be connected to operate either from the room thermostat or from the same terminals which serve the oil burner or stoker motor. When the room thermostat calls for heat, the Draft-O-Stat sets itself for full draft—the flutter swings freely, eliminating excessive draft by balancing out fluctuations automatically. When the room thermostat is satisfied, the flutter opens wide, cutting chimney draft to a predetermined minimum and keeping latent heat in the furnace. Other dealer advertising helps are offered.

FOR YOUR CONVENIENCE

American Artisan, 6 N. Michigan Ave.
Chicago, Ill.

Please ask the manufacturer to send me more information about the equipment mentioned under the following reference numbers in "New Products" and "New Literature." (Circle numbers in which you are interested):

1	2	3	4	5
6	7	8	9	10
201	202	203	204	

Name .....
Company .....
Address .....
Are you Manufacturer——Jobber——Dealer——

TEMPERATURE CONTROL GOES INTO BATTLE

IN PLANES!

Planes have temperature control problems, too. This is but one of the ways our armed forces are using Hydraulic-Action, the positive and effective principle of White-Rodgers Controls.

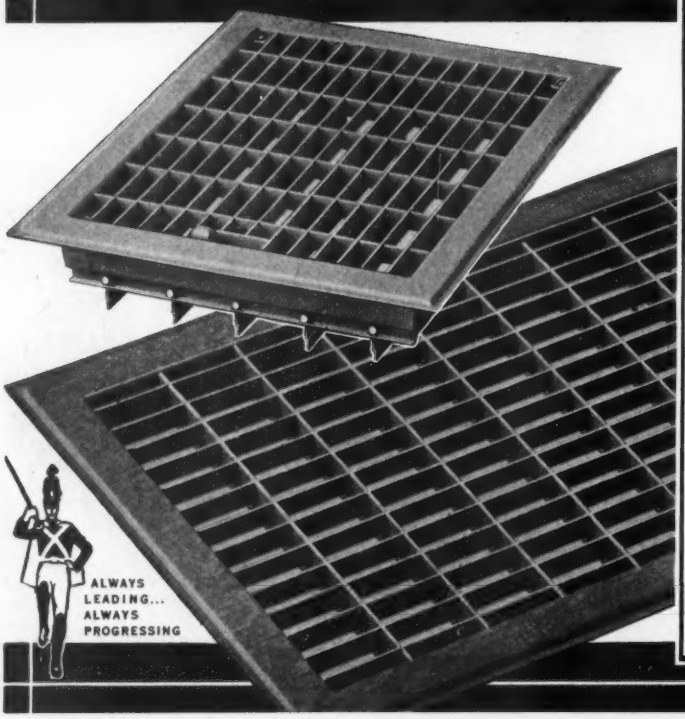
White-Rodgers temperature and pressure controls are available today on priorities of AA-5 or better. Maintenance of existing heating equipment or installation of new equipment essential to the war effort now is possible with these accurate and trouble-free controls.

HYDRAULIC ACTION CONTROL — MEMBER I.C.I. INDOOR CLIMATE INSTITUTE

WHITE-RODGERS ELECTRIC CO.
1215B CASS AVENUE ST. LOUIS, MO.

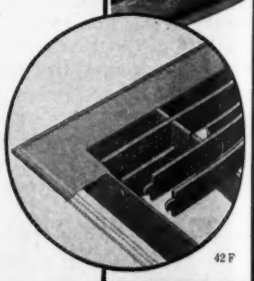
Controls for Heating • Refrigeration • Air Conditioning

INDEPENDENT "Fabrikated" REG. U. S. PAT. OFF.



REGISTERS AND COLD AIR FACES

We are continuing to supply Independent Registers and Grilles for military needs, also for maintenance and repair when orders are properly rated and certified. For other purposes we can often fill a requirement from stock either as specified or with an alternate approved by our customer. We welcome your inquiries.



THE INDEPENDENT REGISTER CO.
3747 E. 93d St., Cleveland, Ohio

42F

★ UNFINISHED BUSINESS ★

UNCLE SAM has "unfinished business" all over the world. But he's getting along with it, fast! We, of PAYNEHEAT, are concentrating on our war job. But when the shooting stops, our dealers can resume *their* unfinished business—with time-tested, years-ahead . . .

Payne

ZONE-CONDITIONING

Post-war successor to old-fashioned central heating! Carefree, fuel-saving gas heating and fresh air circulation . . . under finger-tip control *by zones or individual rooms.* You'll hear more about PAYNE Zone-Conditioning. But meanwhile, let's all help finish the *big* job. *Back the boys with Bonds!*

GAS FUEL HAS EVERYTHING

PAYNEHEAT

NEARLY 30 YEARS OF LEADERSHIP

Payne FURNACE & SUPPLY CO., INC., BEVERLY HILLS, CALIFORNIA

Distribution of 200,000 Replacement Furnaces

(*Continued from page* 60)

LOUISIANA (Cont'd)

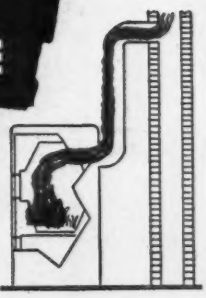
Counties	No. 4 Total Furnaces Installed	No. 5 % of State Total	No. 6 Allotment of State Quota (No. Furnaces)
Caldwell	2	.03	....
Cameron	14	.18	....
Catahoula	....	....	....
Claiborne	7	.09	....
Concordia	10	.13	....
De Soto	6	.07	....
East Baton Rouge	238	3.02	7
East Carroll	1	.01	....
East Feliciana	2	.03	....
Evangeline	36	.46	1
Franklin	3	.04	....
Grant	3	.04	....
Iberia	31	.39	1
Iberville	12	.15	....
Jackson	1	.01	....
Jefferson	546	6.93	15
Jefferson Davis	21	.27	1
Lafayette	695	8.82	20
Lafourche	11	.14	....
La Salle	2	.03	....
Lincoln	344	4.37	10
Livingston	1	.01	....
Madison	22	.28	1
Morehouse	5	.06	....
Natchitoches	2	.03	....
Orleans	5,026	63.78	141
Ouachita	23	.29	1
Plaquemines	....	....	....
Pointe Coupee	5	.06	....
Rapides	64	.81	2
Red River	....	....	....
Richland	7	.09	....
Sabine	8	.10	....
St. Bernard	28	.36	1
St. Charles	120	1.52	3
St. Helena	....	....	....
St. James	7	.09	....
St. John The Baptist	45	.57	1
St. Landry	39	.49	1
St. Martin	2	.03	....
St. Mary	20	.25	1
St. Tammany	12	.15	....
Tangipahoa	17	.22	1
Tensas	6	.07	....
Terrebonne	26	.33	1
Union	5	.06	....
Vermilion	17	.22	1
Vernon	7	.09	....
Washington	100	1.27	3
Webster	12	.15	....
West Baton Rouge	2	.03	....
West Carrol	1	.01	....
West Feliciana	....	....	....
Winn	1	.01	....

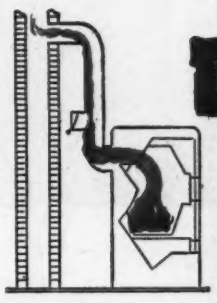
NEVADA

No. 1	Total Furnaces Installed	3,208
No. 2	% of National Total	.05%
No. 3	Allotment of 200,000 Quota	100

Counties	No. 4 Total Furnaces Installed	No. 5 % of State Total	No. 6 Allotment of State Quota (No. Furnaces)
Churchill	39	1.22	1
Clark	161	5.02	5
Douglas	33	1.03	1
Elko	200	6.23	6
Esmeralda	....	....	....
Eureka	7	.22	....
Humboldt	41	1.28	1
Lander	18	.56	1
Lincoln	38	1.18	1
Lyon	35	1.09	1
Mineral	6	.19	....
Nye	3	.09	....
Ormsby	81	2.53	3
Perching	19	.59	1
Storey	....	....	....
Washoe	2,422	75.50	76
White Pine	105	3.27	3

WHEN HEAT GOES UP THE CHIMNEY LIKE THIS





INSTEAD OF STAYING INSIDE LIKE THIS

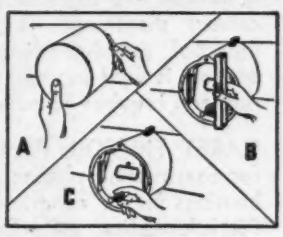
INSTALL A DRAFT CONTROL

Like This

FIELD

The Line's Complete and . .

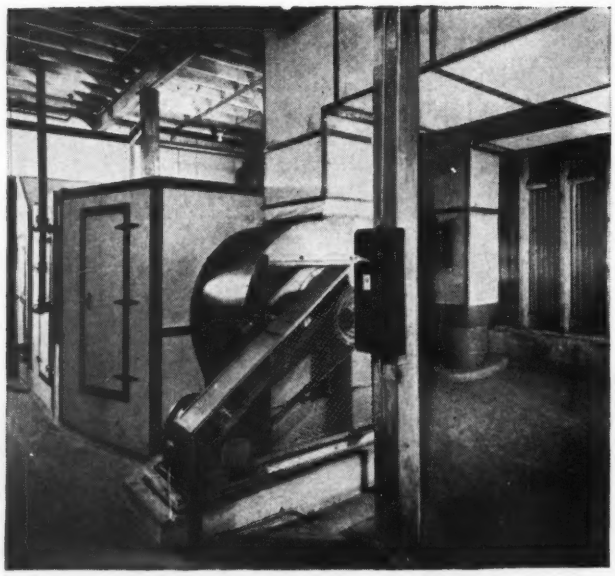
INSTALLATION'S SIMPLE AS A B C



A Hold collar snugly against stove pipe in correct position and mark outline on pipe. Snip hole in pipe ½" smaller than mark; snip slits ½" deep around hole.

B Strap collar to pipe; bend ½" slits into collar. Fasten control into collar and true control up and down and sideways by checking with carpenters spirit level for accuracy.

C Factory balanced, control requires only a simple hand adjustment for the particular installation. Set for minimum draft consistent with combustion and heat demands as required.



Carey FIREFOIL PANEL

Saves Vital Metal . . .

Gives Top Efficiency in

AIR-CONDITIONING SYSTEM at

Chrysler Corporation's Dodge Chicago Plant

In planning Chrysler Corporation's Dodge Chicago plant, top efficiency was the keynote throughout—in the building itself, its equipment, and construction materials used. For some of the air-conditioning system, CAREY FIREFOIL PANEL was selected for the same reasons it has been specified for other important installations—its inherent advantages, plus savings in war-vital metal.

CAREY FIREFOIL PANEL is a unique structural insulator. It is a hardened asbestos insulating board, consisting of corrugated asbestos felts firmly bonded and surfaced on each side with asbestos-cement sheathing. The result is a strong, rigid, fireproof, sound-deadening material. Eliminates vibration, is light in weight, and waterproof—will not rust and requires no painting.

CAREY FIREFOIL PANEL is designed especially for constructing plenum chambers, large ducts, and housings for air conditioning and other equipment. For information, write Dept. 100.

Illustration shows use of Firefoil Panel in air-conditioning unit installed by Narowetz Heating & Ventilating Co., Chicago, Ill. Plant designed by Albert Kahn, Associated Architects & Engineers, Inc., Detroit, Mich.

THE PHILIP CAREY MFG. COMPANY • Lockland, Cincinnati, Ohio
Dependable Products Since 1873
IN CANADA: THE PHILIP CAREY COMPANY LTD. Office and Factory: LENNOXVILLE P. Q.

ARIZONA

No. 1	Total Furnaces Installed	7,144
No. 2	% of National Total	.10%
No. 3	Allotment of 200,000 Quota	200

Counties	No. 4 Total Furnaces Installed	No. 5 % of State Total	No. 6 Allotment of State Quota (No. Furnaces)
Apache	30	.42	1
Cochise	621	8.69	17
Coconino	74	1.04	2
Gila	76	1.06	2
Graham	19	.26	1
Greenlee	....	....	....
Maricopa	3,876	54.26	108
Mohave	27	.38	1
Navajo	136	1.90	4
Pima	1,930	27.02	54
Pinal	67	.94	2
Santa Cruz	84	1.17	2
Yavapai	174	2.44	5
Yuma	30	.42	1

◆

Stoker Refinements

(*Continued from page* 53)

there is very little tendency for coal to work through them or fill them up. Manufacturers provide a variety of methods of inspecting and cleaning of these holes. The instruction book of the particular machine in question should be consulted in case it is felt that it is necessary to clean the smoke back holes.

It will be seen that if air is put directly into the coal tube some of it will be likely to work back into the hopper. To stop this and as further aid in stopping smoke from working back into the hopper, manufacturers try to keep the coal packed rather tight in at least part of the coal tube. General practice is to keep the coal packed under the spike trap and then loosen it up as outlined in Section I.

Since there is always a chance that some smoke or at least some coal dust will come back in the hopper it is general practice to seal the hopper so that no smoke can get out into the basement. Some designers go a step further and put an air pressure into the hopper. Others vent the hopper to the fan inlet so that any gases are drawn back into the fan.

[Part 2 will follow]

◆

Coming Conventions

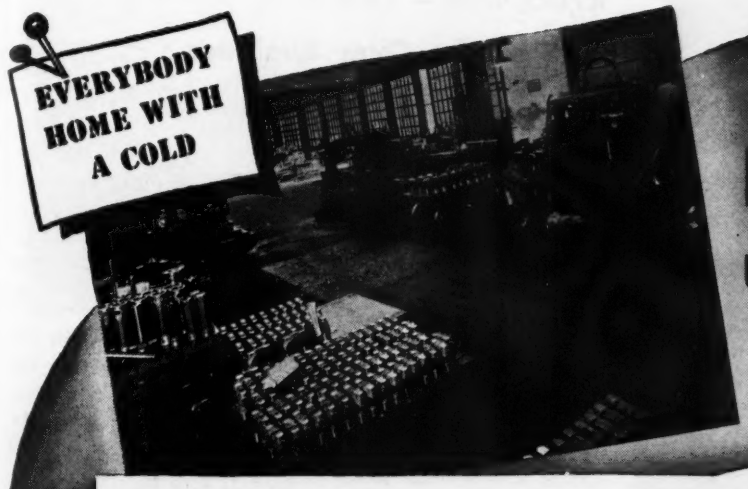
1944

Mar. 2-3-4—Michigan Sheet Metal, Roofing, Heating & Air Conditioning Contractors Annual Convention, Occidental Hotel, Muskegon. N. J. Biddle, Secretary, 7310 Woodward Ave., Detroit 2.

Mar. 29-30—New York State Sheet Metal, Roofing & Air Conditioning Contractors' Assn., Inc. Annual Convention. Albany, Ten Eyck Hotel. Clarence J. Meyer, State Secretary.

Apr. 12-13—Sheet Metal Contractors Association of Illinois. Annual. Jefferson Hotel, Peoria. Frank Eynatten, Treasurer, Peoria.

Apr. 27-28—Sheet Metal Contractors' National Association, Inc. First Annual. LaSalle Hotel, Chicago. Clarence J. Meyer, National Secretary.



Prevent this with a

DIRECTHERM

UNIT HEATER STOKER-FIRED

A Directherm will keep your plant warm and every man on his job.

It spreads the heat evenly as far away as 200 feet and squeezes 80% fuel energy out of coal, gas or oil. Easily installed and operated; eliminates costly duct work, radiators, and pipes.

Little maintenance required — automatic controls do the work.

Made in six sizes (300,000 — 1,700,000 BTU). Write for our descriptive bulletin.

AIRTHERM MANUFACTURING COMPANY

706 SO. SPRING AVENUE, ST. LOUIS 10, MISSOURI

FULL POWER... LONGER LIFE

PEXTO

The test of heavy duties and longer hours is again proving the superior qualities of PEXTO Machinery for fabricating Sheet Metals.

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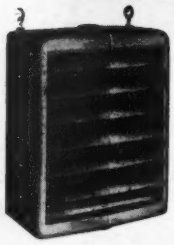
War plants, army barracks and other vital war-time buildings need heating and ventilating, or exhaust and blow pipe installations. This high priority business can be your salvation. Specify Clarage Fans, Blowers, Unit Heaters! Nationally known and Nationally accepted, these highest quality air-handling products help you land the desirable jobs. **Write today for descriptive literature.**



UNIT HEATERS

EXHAUST FANS

VENTILATING FANS

COMPLETE AIR CONDITIONING • COOLING • VENTILATION • FACTORY HEATING • MECHANICAL DRAFT • FANS and BLOWERS for INDUSTRIAL NEEDS

Clarage Fan Company Kalamazoo, Mich.

APPLICATION ENGINEERING OFFICES IN ALL PRINCIPAL CITIES

Kruckman — Can Gov't Take Over Business

(*Continued from page* 41)

debt service on $300,000,000,000, $9,000,000,000 annually; unemployed relief, $4,000,000,000; veterans care and benefits, $2,000,000,000; other expenses of Government, $4,000,000,000. Against this annual need for $19,000,000,000 we know that the maximum Federal taxes collected in any year prior to the war totalled approximately $8,000,000,000.

Dr. Morgan mentions other uncertainties in his address: "A labor organization has successfully defied the President of the United States and has compelled a settlement on substantially its own terms. Who can foresee the significance of that action? There are several industries in America the employees of any one of which, by united action, could bring government to its knees. This is true of the railroad industry, the electric power industry, the petroleum industry, and perhaps the telephone industry. Other groups, such as postal employees, maritime workers, milk deliverers, rubber workers, and automotive workers, in their various present jobs, might, any one of them, dictate its own terms. . . . A fear of impending economic chaos may throw the entire country into the hands of reaction, for the disadvantaged part of the population may be the majority. . . . In view of these various possibilities, and of the general trend toward centralization, the Federal government may step in, and with as authoritarian methods as may be necessary, may proceed to nationalize industry, to provide universal em-

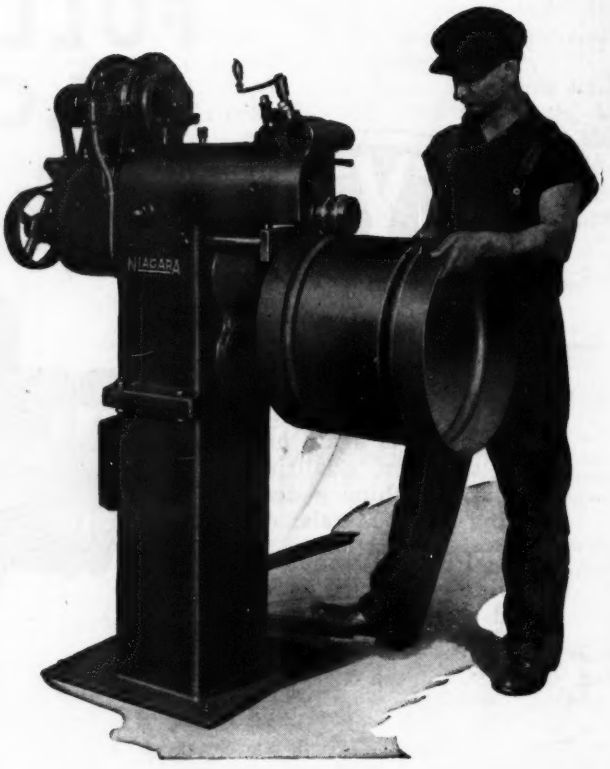
This motor driven combination machine with interchangeable rolls combines power operation, ability to handle heavy gage work, and easy operation.

Foot control of clutch and upper roll allows the use of both hands for holding and guiding the work.

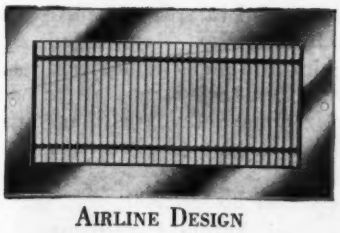
Interchangeable rolls make one machine capable of burring, turning, wiring, beading, crimping, flanging, slitting and circle cutting. Beading and crimping can be done in one operation.

Gears and shafts are enclosed. Gear box contains intermediate gears and clutch, all running in oil. Clutch gives instant hand and foot control and can be locked for continuous operation.

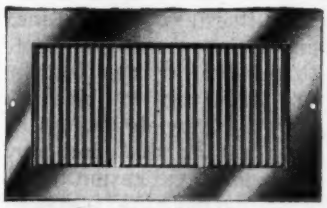
Write for Bulletin 75A. NIAGARA MACHINE & TOOL WORKS, Buffalo, N. Y. District Offices: Detroit, Cleveland, New York.



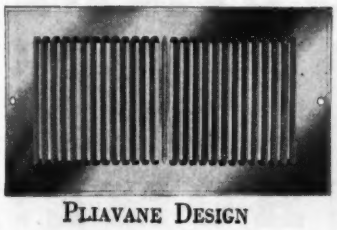
FOR RESIDENTIAL AIR CONDITIONING



AIRLINE DESIGN



FLEXAIR DESIGN



PLIAVANE DESIGN

Popular face designs . . . Standard installation frame constructions, all interchangeable . . . Return air intakes to match face designs . . . Excellent duct concealment . . . A price group for any type of installation.

★ ★ ★

For years you have known the Tuttle & Bailey name and appreciated the quality of all Tuttle & Bailey products. And we shall be ready soon to announce a postwar line which will maintain and enhance this enviable reputation.

TUTTLE & BAILEY

REGISTERS

GRILLES • INTAKES

AIR CONTROL DEVICES

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INCORPORATED
NEW BRITAIN, CONN.

Send today for Catalog No. 41

ANSWERING THE BURNING QUESTION OF POST-WAR AMERICA...

Copy of this book sent upon request.

Just off the press, this book is an illuminating and candid discussion of the automatic-heating picture, as it will exist in the hard coal-burning areas, with the return of peace. The unbiased facts present a strong case for stoker-fired anthracite, as compared with other fuels available for automatic heating.

MOTOR STOKOR

advertisements in *Better Homes & Gardens,* and *American Home,* offer to the general public the book entitled, "What Can I Expect From Automatic Heat In The Future?" Applicants for it will form a promising back-log of prospects for dealers, when production is resumed.

MOTORSTOKOR DIVISION
HERSHEY MACHINE & FOUNDRY CO.
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Dealers:

THE FAMOUS

FROS-T-AIRE

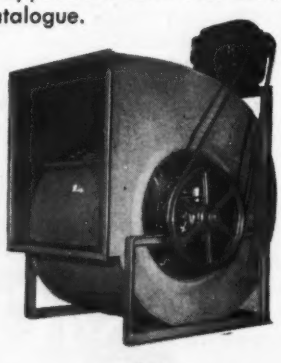
COMFORT COOLING

IS NOW

available for stock

Make 1944 your biggest year. Stock the finest! Palmer, maker of Fros-T-Aire evaporative coolers, has been manufacturing coolers for over 30 years. See your local WPB for application form No. 547, and write for Palmer's catalogue.

PALMER
QUIET-ZONE
BLOWERS



For cooling, heating or ventilating choose America's finest air-moving equipment. It costs no more! Absolutely quiet . . . heavy construction . . . dynamically and statically balanced. Immediate delivery on complete blowers, blower wheels, or other parts at competitive prices.

Palmer

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PHOENIX, ARIZONA

Manufacturers of Forced Air Furnaces, and . . . Sno-Fluf excelsior and pads for evaporative coolers (especially processed from prime aspen. Immediate delivery.)

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City.....State.....

ployment, and to proceed far toward a liberal totalitarianism. . . . I shall not assume any one of these solutions. All these tendencies will exist and will interact. It may be no one of them will be dominant. It may be that the actual course during the post-war period will be a process of uncertain half-steps, of expedients, makeshifts, compromises, daring undertakings in some fields and cowardly retreats in others. It may be that underlying all these stresses will be a permeating conviction that first of all we are Americans, that those factors which divide us are less than those which unite us. The old American distrust for extremes may still be strong. . . . In my opinion there will be a steady increase of governmental functions. . . . It is primarily industry rather than government that is driving toward totalitarianism. This is partly because a constantly larger proportion of workers is employed in specialized operations in mass production industries. Men's minds are largely made by their jobs, and mass production jobs generally are dull. That tendency is not all in one direction, however, for in some industries mass production develops so far as largely to eliminate routine labor."

Small Business Can Be Efficient

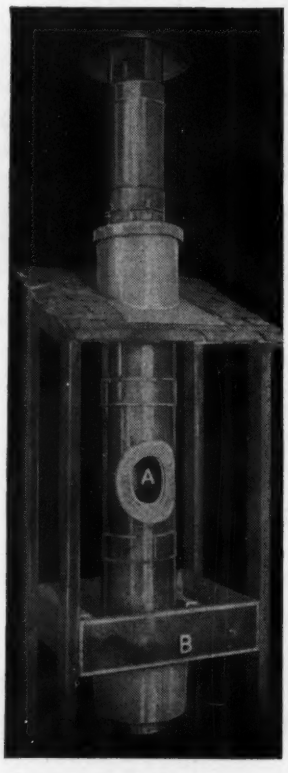
The individual may feel helpless and may be dulled in the mass, but it seems just as apparent that Bigness eventually destroys itself. Willis Ballinger of the Federal Trade Commission, making a careful investigation, found that smaller units of industry are definitely more efficient than large combinations. Bigness is burdensome, clumsy, unwieldy. This has lead the Government to regionalize the administrative machinery; they call it decentralization. While the trend is toward consolidation, the individual

VITROLINER

FLUES

for Post War

HOMES



Will be one of the most important and radical changes in home construction. The Vitroliner Type "E" Flue is suspended from the ceiling and REQUIRES NO FOUNDATION OF ANY KIND. Vitroliner can also be built into partition walls if desired.

New heat saving features will be incorporated in the post war Vitroliner flue which will be much lower priced than the masonry chimney it replaces. Draft will be double that of the masonry chimney of the same height and cross section area.

Type "E" Vitroliner extends from the ceiling "B" thru attic space and roof as illustrated in display model. "A" break-away section shows inner vitreous enameled steel construction and pre-formed Fyrex asbestos insulation. The outer casing sections form a continuous wall of vitreous enameled steel.

Write for details and Folder

Condensation Engineering Corporation

2515 ARCHER AVE. **CHICAGO 8, ILL.**

Randall **PILLOW BLOCKS**

dependable
low-cost
long-lived

Quiet

There are more air-handling units equipped with Randall Pillow Blocks than any other. Years of satisfactory service in the field prove the correctness of these installations.

Self-aligning and self-lubricating Randalls give long, trouble-free, reliable operation with only minimum maintenance. If Randalls are not now standard on your equipment, write for Catalog No. 42 showing an efficient Randall for every pillow block need.

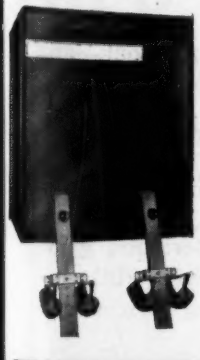
One-Piece Steel Housing Pillow Block

RANDALL GRAPHITE PRODUCTS CORP.
Dept. 211 609 W. Lake St. Chicago, Ill.

Simplex Automatic Draft Controls
For Greatest Fuel Economy

5 *in* 1
"SIM-TROL"

The SIM-TROL control with Simplex adjustable sleeve is adjustable to breechings (or smoke flues) from 8" to 12" inclusive, which covers the range of most domestic heating plants. Will save up to 25% in fuel; maintains draft at 1/100 of an inch of the desired point under all conditions.



Type "A" Industrial Control

References, as to efficient operation and economies effected by Simplex Controls on plants of various sizes up to 1,800 H.P. can be furnished. In many cases savings of over 25% have been made.

Most complete line of Barometric Controls for every size heating plant. Write for full descriptive circulars.

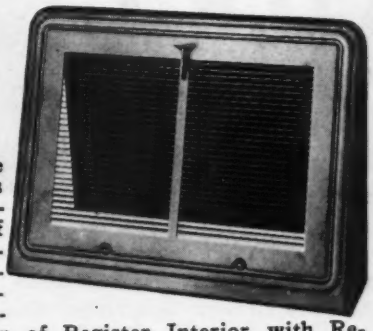
SIMPLEX
MANUFACTURING COMPANY
FOND DU LAC, WISCONSIN

Registers Roll Through Production As Fast As Steel Comes In

Do it now—when Register stocks are Low—shift to the Modern, Popular U. S. Lines. Our Equipment is intact, ready to achieve Peak Production the minute the last gun is fired —helping you to meet the greatest building boom in history.

Make U. S. your source of supply for the latest designs in Registers, Faces, Grilles and Complete Requirements for Gravity and Air Conditioning Installations . . . and you'll be ready First with the Best!

No. 40 SERIES
GRAVITY BASEBOARD REGISTERS



Typical of the U. S. values is the 40 series—today's finest of Gravity Baseboard Registers! Least resistance — complete non-vision of Register Interior with Removable Register Face and Convenient Face attaching feature. Leakproof when properly installed.

SEND FOR:
Catalog 41G Gravity Lines.
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UNITED STATES REGISTER CO.
BATTLE CREEK, MICHIGAN
MINNEAPOLIS • KANSAS CITY • ALBANY

WHEN restrictions on heating equipment will be eased . . .

WHAT tremendous part of national purchasing power will be spent on home improvements . . .

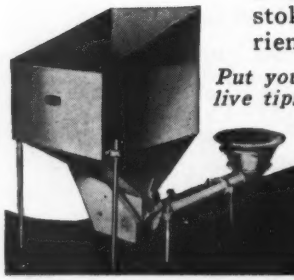
WHO will be in the most favorable position to cash in on these opportunities . . .

But WE DO KNOW . .

. . . that the dealer with a sound franchise on dependable automatic coal burning equipment will be "sitting pretty".

. . . that we will be prepared with a complete line of domestic stokers, built with the experience of years of "know how".

Put your name on our mailing list for live tips on "Things to Come".



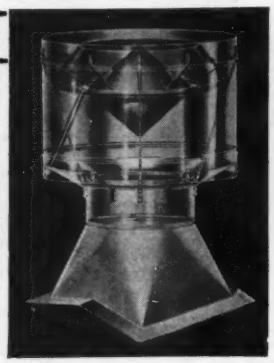
CATSKILL METAL WORKS, INC.
CATSKILL, NEW YORK

FREE-FLOW GRAVITY

RECOMMEND

BURT

Free-Flow Gravity VENTILATORS FOR GENERAL VENTILATION



A good share of your ventilator prospects can be served economically and efficiently with the BURT Free-Flow Gravity Ventilator. Designed so the entire discharge is vertically upward resulting in maximum velocity and volume *plus* an airflow baffle design that increases syphonage action. Easy to install and trouble-proof . . . Get full details now on the complete BURT line. It includes a size and type engineered for every ventilating need, at prices that make you money. BURT engineers are ready to help you estimate and lay out plans. Write—today.

THE BURT MFG. CO.
ROOF VENTILATORS • OIL FILTERS
EXHAUST HEADS
301 Main St., Akron 11, Ohio

SEND FOR CATALOGS
•
Burt Engineers are glad to help on plans

seeks affiliation with others of his own kind in smaller units. It is found he eagerly cooperates with those who offer a specific objective.

Apparently there is a growing awareness that part of the solution to some of his problems is to create his own pressure group. He is beginning to realize that in this vast expanse of 3,000,000 square miles plus of varied geography, climate, and 130,000,000 individuals, individually he is a tiny grain of sand, and that his vote by itself is akin to a drop of rain. But he is conscious that a group with a purpose, even a small group, makes itself heard in Washington and elsewhere. And fortunately he also has learned to disregard the smear tactics that are used by the other pressure groups to discourage the creation of more pressure groups.

Only National Organization Can Exert Influence

This country obviously is huge, and the enormous number of its population make awkward the relation of the individual with the Government in the sense intended by those who made the machinery when the nation was very much smaller. There does not appear to be any practical manner of arresting attention in Washington except by the influence of the significance of an organization. In the years ahead it will undoubtedly be necessary for any trade or industrial or business or social group having business with Government—and who hasn't—to maintain some constant liaison with the agencies of Government in Washington. And it is not improbable that if this representation of the smaller individual through an organization increases, the multiplication of these groups may tend to check the drift towards the absorption of Government by Big Business or

WILL WILLIE WILLIAM BILL

4 Little "Fitting" Guys Fighting For You!

Will cuts installation costs—
Willie makes fittings fit—
William keeps prices down to bed rock—and Bill sees that there is a stock near you.

FLASH NEWS! Complete, simplified line Gravity Pipe and Fittings now available on rated orders—24 hour service and shipments.

FREE: Complete, easily understood gravity pipe and fittings catalog showing full simplified line. Write Dept. 2 for prices and catalog.

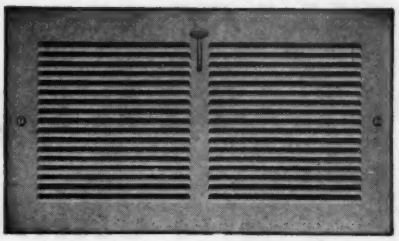
THE WILLIAMSON HEATER COMPANY
CINCINNATI 2, OHIO

WILLIAMSON
WARM AIR FURNACES

of Big Business by Government. The balance in the adjustment may lie with smaller business, if its individuals organize.

Dr. Morgan obviously believes the small independent proprietor, still operating in the atmosphere of free enterprise, is the hope and the answer to many of our problems. He says:

"The number of men desiring to be proprietors is still so great that every *visible* nook and cranny in our economic system is filled by would-be entrepeneurs. I say, every *visible* nook and cranny, because, in my opinion there are innumerable possible openings for those who have the imagination, discipline, and staying quality to realize possibilities. The limitation is in imagination and outlook, not in actual possibilities. It is not the economic frontier that has disappeared in America. In my opinion, the opportunities for self-directed effort are greater than they ever have been. However, the appetite for adventure is less, and the willingness to live hard is less. That is due to the fact that organized group production, as in mass production industries, is so highly productive, and demands so much less preparation, self-restraint, and self-denial, than does the rigorous discipline of self-directed effort, that the larger and easier returns which go with mass production are generally preferred. . . . I should not try to turn back the clock toward a primitive economy, but I should be inclined to explore for every opportunity to harmonize modern technology and modern administrative practice with small units of operation. . . . To take that course means to go against the present prevailing current, but it may mean also greater stability and variety to American life, more wholesome conditions for rearing the next generation, and



Airo-Flex 7032 Single Louvre Adjustable Register

AUER is now engaged principally on vital aircraft parts and other war-time products. We are still able to furnish most styles of registers from inventory stocks, for all purposes permitted by Federal regulations.

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The key to
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roof ventilating jobs-

The Swartwout Line of easily installed ventilators

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Write for Bulletin 214

The Swartwout Co.
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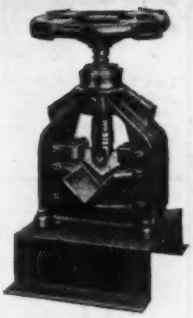
Swartwout VENTILATION SPECIALISTS

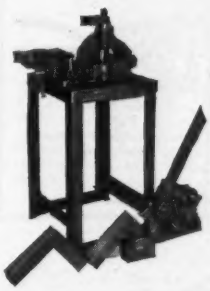
WHITNEY-JENSEN PRODUCTS
30 YEARS EXPERIENCE

NEW! NO. 162 SHEAR

For cutting off angle iron up to 3" x 3" x ¼" clean and square *with no distortion of ends.* Double cut blade shears both sides. Ball Bearing Screw Action provides maximum power with minimum effort. Easily operated by one man. For bench or floor use.



WRITE FOR CATALOG.



ANGLE IRON COMBINATION SHEAR-NOTCHER-BENDER

Three standard Whitney-JENSEN units are conveniently positioned on a sturdy welded steel stand—the No. 4 Angle Iron Shear, No. 50 Mitre Notcher, and No. 51 Bender—to form this No. 455 Combination. Capacity 2" x 2" x ¼" angle iron.

OVER 80 USEFUL SHEET METAL TOOLS

WHITNEY METAL TOOL COMPANY
91 FORBES ST. • ROCKFORD, ILL.

a larger number of self-reliant citizens who can help give vitality and direction to democratic life. . . . In a period of consolidation and centralization and perhaps nationalization of industry, the smaller activities may be among the last to be devoured, and may survive to set a new and better pattern for America.

"There was a day when the great saurians had things their own way, and seemed to be taking the earth. Yet the future did not belong to their kind but to the descendants of some curious little creatures no bigger than rabbits, who scampered about among the trees and rocks, and survived by their agility. The future belonged not to the saurians but to the mammals. Similarly, I believe, the future may have a place for those small economic units that can keep flexible and adaptable, and that can be a training ground for self-reliance, which need not be out of harmony with a spirit of cooperation and of social responsibility."

Suggested Post War Procedure

Dr. Morgan suggested certain steps for the individual and his community toward economic readjustment after the war. First, an analysis of the local manpower situation, including those who entered the armed services and those who remained home, and what they might be able to do. Second, a study of local public works which may be undertaken during the transition period after the war. Third, a study of improvements and maintenance for private

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Seasoned With 40 Years Experience

. . . In New Developments For The Future

The Majestic Co., 912 Erie St., Huntington, Ind.

WHITNEY LEVER PUNCHES

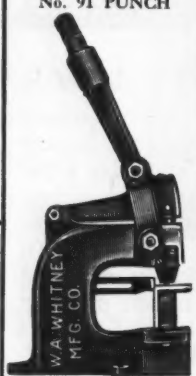
No. 4B PUNCH

Length 8½ inches. Capacity ⅛-inch through 16 gauge. Deep Throat — 2 inches. Weight—3 pounds. Punches and Dies—1/16" to 9/32" by 64ths.

No. 6 PUNCH

Length—26½ inches. Capacity — ⅛ - inch hole through 9/16-inch iron; especially adapted for button punching or templet work. Punches and dies ⅛" to 9/32" by 32nds.

No. 91 PUNCH



CAPACITY

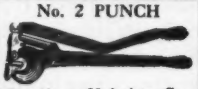
½-inch hole through ¾-inch iron; ¾-inch hole through 3/16-inch iron; 2-inch hole through ⅛-inch iron. Depth throat, 5 inches. Weight, 82 lbs.

We have tools for every purpose needed by Sheet Metal Contractors.
Ask your Jobber

No. 1 PUNCH

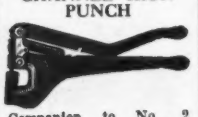
Length—34 inches. Capacity — ⅝ - inch hole through ⅛ - inch iron. Punches and dies in sizes from ⅛ to 9/16 by 64ths.

No. 2 PUNCH



Length — 23 inches. Capacity — 5/16-inch hole through ⅛ - inch iron. Punches and dies in sizes 3/32" to ½-inch by 64ths.

CHANNEL IRON PUNCH



Companion to No. 2 Punch. Every part of the two Punches Interchangeable, including punches and dies. Capacity—¼-inch hole through ¼-inch iron.

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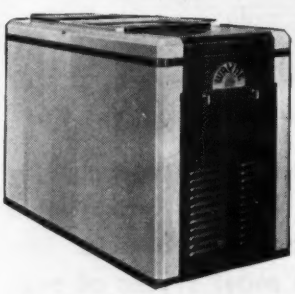

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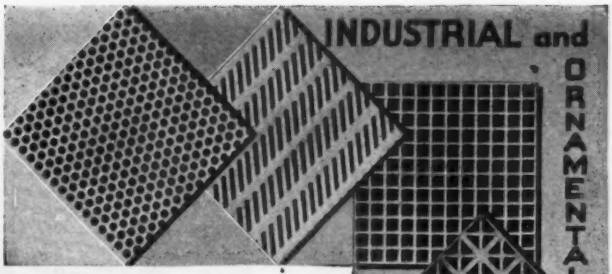
OIL-FIRED, GAS-FIRED, COAL-FIRED FURNACES, STOKERS, BOILERS, WATER HEATERS.
CONVERSION BURNERS FOR OIL AND GAS.

LINE UP WITH WAYNE FOR POST WAR PROFITS

property that has been delayed. Fourth, a local study of economic possibilities in various fields. He suggests the locality should determine whether or not it can support a welding shop, a woodworking shop, and a shop for servicing general mechanical equipment and appliances. He tells the story of Yellow Springs, Ohio, in these words:

"A little more than twenty years ago I moved to a small community of 1,600 people which relied almost wholly on farm trade and a small college. Most boys and girls growing up there had to leave home to find economic footholds. Little by little that community has initiated small industries until a half a dozen of them, before the war boom, were absorbing nearly all available young men and women for miles around in a considerable variety of fields and degrees of responsibility. In that development we find ourselves in a social microcosm. We have to face on a small scale many of the problems that are shaking our nation and the world. We must work out problems of race relationships, labor and management relationships, working conditions, ethical problems as to products, advertising, etc., problems of combinations and monopolies, and many others. In some cases we have pioneered and have achieved results important far beyond the number of persons or the finances directly involved. Often it is possible to pioneer on a small scale as it is not in a great organization, and in a real world, not in an ivory tower. My study has convinced me that the day of small industrial units has not passed, and that our smaller communities can be made economically satisfactory and socially desirable."



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. . . all its facilities and a wealth of experience in the perforating of metals and other sheet materials to further the essentials of war. Round hole perforations are available in a wide range from as small as .020" dia. to 7" dia.—slot and oblong holes are made as narrow as .008" and as wide as required. Write us for any information needed.

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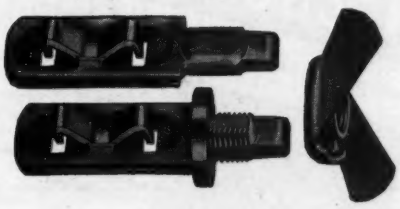
SPEED UP

YOUR DAMPER INSTALLATIONS WITH E-Z-ON DAMPER REGULATORS



• Even unskilled labor can save valuable minutes on damper work, when you use E-Z-ON Regulators! Just a few seconds' time, a few quick hammer blows and the job is finished . . . smooth-operating, rattle-free, durable, dependable. A job you can be proud of—at a lower cost that helps boost your profits on new and remodelled heating plants.

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Instantaneous, direct readings of air speed measured in feet per minute with the *Alnor* Velometer give you the quick, accurate information on air movement needed to check operation of blowers, fans, air conditioning installations, and similar equipment. No calculations, no timing, no conversion tables; read velocities direct from the Velometer scale. Extension jets permit accurate readings in many locations that would be completely inaccessible with other means of measurement.

The Velometer is made in several standard ranges from 20 fpm to 6,000 fpm, and up to 3 inches static or total pressure. Special ranges available as low as 10 fpm and up to 25,000 fpm velocity and 20 inches pressure.

Write for Bulletin No. 2448-E.

Illinois Testing Laboratories, Inc.

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Blower Wheels

Janette wheels embody a patented design, which enables them to stand exceptionally hard service. For over 18 years, these wheels have given reliable service to manufacturers, whose names are the "WHO'S WHO" of the stoker, oil burner, ventilating, generator, supercharger and air cooled gasoline engine industries.

Janette wheels are rugged, quiet in operation and deliver their maximum volumes of air with a minimum of air noise and power consumption.

You too, would be pleased with their performance.

Janette Manufacturing Company
556-558 W. Monroe St. Chicago, Ill.

This reporter has discussed the subject of this letter with a large number of persons, ranging from men like Ernest H. Gaunt, of Lawrence, Mass., head of the oldest and most vigorous organization of Small Business Men, to Jesse Jones, Secretary of Commerce. It is striking and curious that they all agree on one idea: that the transmutation of Big Business into Big Government, or Big Government into Big Busness, if circumstances should force the eventuation, could be checked, undoubtedly prevented, by the influence of a vital functioning system of smaller business, individual, competitive, free, and vocal through cooperative trade and other organizations. Smaller business seems to hold the hope of democracy.

◆

Low Down On Cut-Backs

(*Continued from page* 71)

some cases to cutbacks in military equipment and in others to overproduction, according to WPB, are:

(1) Bauxite—aluminum ore—will have been cut back by about 40 per cent by the end of January. Primary aluminum production will probably be curtailed nearly as much within the next few weeks.

(2) Alloy steels are now plentiful. However, facilities for rolling steel are still short and finished plate will be on the critical list for some time to come.

(3) Copper, magnesium, zinc, and molybdenum, desperately short only six months ago, are now fairly plentiful.

(4) Practically all other metals, including tin, are expected to come off the critical list—barring unforeseen developments—during 1944.

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GRAVITY
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Branches: Boston · New York
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Refrigerant-Cooled Spot Welding

(*Continued from page* 70)

In one instance when the holders were not carefully washed following a brine cooling test, it was found that with the insertion of new eletrodes the secondary current output of the welder was reduced by about 18%.

Careful inspection disclosed that the reduction in output was caused by the presence of deposited salt on the tapers of the refrigerant-cooled adaptor.

(*b*) When welding was attempted with a heavy coating of frost on the electrodes, holes would be blown into the sheets to be welded. This phenomenon may be due to arcing, and an instantaneous formation of steam surrounding this overheated zone. The formation of ice probably prevents the normal penetration of the radius face of the electrode into the metal being welded, causing the current to flow through a very restricted area.

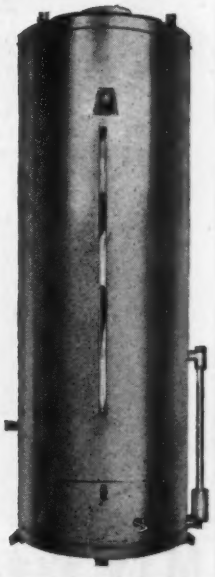
(*c*) In the initial tests continuous welding was carried out on aluminum alloy sheets about 10x12 in., the welding progressing up one row and down another, the guiding of the sheet being done manually.

It was impossible to obtain symmetrical welds and the surface appearance of the spot was gen-

Lochinvar

OIL BURNING WATER HEATERS

The SECRET of Lochinvar's Outstanding Success is the MULTIPLE-STAGE BURNER



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14101 PRAIRIE DETROIT 4, MICHIGAN

KEEP A FULL FORCE WORKING!

Keep all your men on full time working schedules by having them install Streekno in all your warm air heating jobs. Streekno saves hundreds of dollars in decorating, eliminates dirt streaks above and around registers.

Millions of home owners want it. It sells for only $2.00 and you make a big profit. Don't lose men in the slack season.

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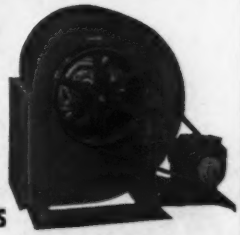

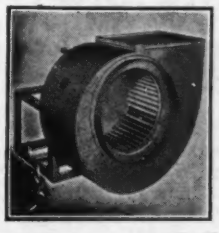

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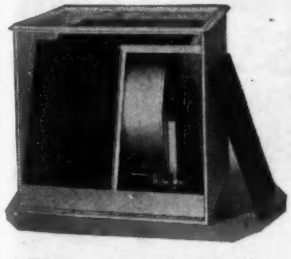

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• While our present production conforms to the conservation program of the government, our dealership plans are now being set up for the post-war period. Send for literature.

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Furnace Repair Parts

The furnace choice of dealers who know performance and saleability has been Ath-A-Nor for more than 50 years. Quality, economy and efficiency have always distinguished the Ath-A-Nor line. Replace with Ath-A-Nor to insure maximum performance and fuel economy! And continue to pile up scrap for munitions and see that it reaches government agencies speedily!

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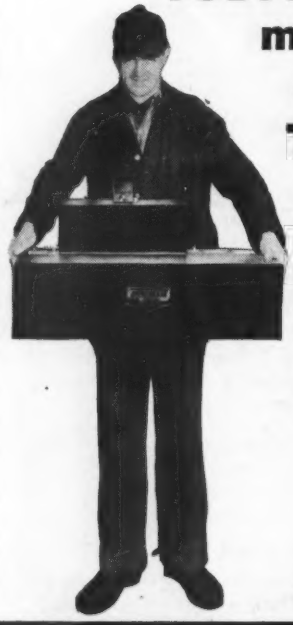

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Write for fully illustrated literature.

The LOCKFORMER Co.

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erally distorted, depending on the alignment with which the sheet was held.

In order to produce welds of consistent sym-

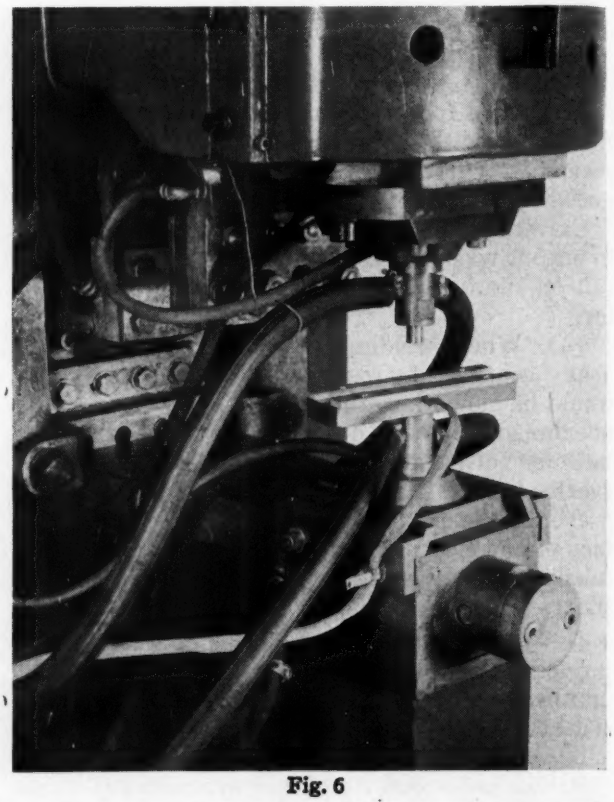

Fig. 6

Std. Arr. No. 1 for Belt Drive

New and Improved "EX" Fans are now available in standard sizes from No. 15 to No. 80 and from 200 to 30,000 CFM Capacity with pressures up to 15" W.G. These fans are commonly used for exhaust problems to handle dust, fumes, shavings, etc., but can be adapted for forced draft service.

"EX" Fans are furnished in all standard arrangements of the N.A.F.M. The design is such that it can be easily modified to suit special assemblies, thus "EX" Fans are ideal for resale purposes, as part of factory assembled units.

Write us about your problems. Send for Bulltin No. EX-41

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Main Office & Factory

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metry and uniform indentations, a simple fixture was attached to the lower welding electrode which accommodated strips 1 in. wide. This fixture maintained the position of the weld in the center of the strip and held the flat surface of the strip in a plane normal to the axis of the electrodes. The strips used in the continuous welding tests were 24 in. long. The fixture may be observed in Fig. 6.

From the data collected on experiments carried out on the 100-kva. welder, it was impossible to draw any definite conclusions as to the relative rate of electrode deterioration that might be encountered between refrigerant- and water-cooled electrodes.

Discrepancies in rate and nature of electrode deterioration were wide and varied, and although there seemed to be a tendency to improvement in electrode life with refrigerant cooling, it was believed that the skidding and movement of the electrodes on the work under pressure during welding tended to obscure the true significance of the test results.

[To be continued]

◆

W. P. Roberts, formerly vice-president of Sunbeam Heating & Air Conditioning Co., Inc., is now district manager of **Lennox Furnace Company** with offices at 1925 Seward St., Evanston, Illinois, since January 1.

His territory will include Cook, Lake and DuPage counties in Illinois and Lake County, Indiana.

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BEST BY FORTY-TWO YEARS TEST

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Basically better ventilation engineering has enabled Allen to furnish industry with more than four thousand Allen Type "H" Roof Fans at an average saving of $62.50 per unit over the nearest comparable equipment —more than a quarter million dollars.

The explanation is simple. Allen patents cover the use of dampers balanced in the effluent air stream—open when the fan is running, closed automatically when power is off. This is in contrast to construction used by several other manufacturers wherein mechanical, motor-operated dampers are mandatory and up the cost.

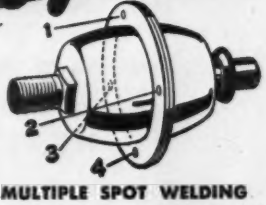
Approximately 400 of these Allen units top the huge Willow Run Bomber Plant alone. Allen has an answer for your ventilation problem, too, whether it's ordinary or extraordinary. Let's talk it over. *The Allen Corporation, 9751 Erwin Avenue, Detroit 13, Michigan.*

THE *Allen* CORPORATION

ENGINEERED VENTILATION FOR INDUSTRY

HOW TO SPOT WELD

4 Times Faster



MULTIPLE SPOT WELDING

sketched above on a Muffler Shock Insulator Assembly, made possible a welding rate 4 times greater than could have been reached by individual welds. A special die, designed to weld points 1, 2, 3, and 4 (above) at one contact made this possible. The older way would have to weld point 1, turn the piece, weld point 2, turn the piece again, etc.

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Instead of welding 4 individual spots on this welded job the older way, Harris Products Co., Cleveland manufacturers of vibration insulators, installed a special projection welding die, making it possible to speed production by 4 times the former rate. Perhaps you, too, can profit by adapting projection welding techniques to your work and by using the improved Model J Spot and Projection Welders. Designed for general work, these models contain several new features not found in resistance welders selling for far greater prices. Write today, telling us your problems. We will offer our best possible help at no obligation.

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UNIVERSAL POWER CORP., 4898 Euclid Ave. Cleveland 3, Ohio.

Please send complete story on your Spot and Projection Welders and accessories and how they can help me.

NAME .....

ADDRESS .....

CITY..... STATE.....

THANKS — For Your Cooperation

We appreciate the patience of our many customers during these days when war production and restrictions make it impossible to give them the kind of service they have come to expect from PEERLESS. Your cooperation is helping us to do our full part in the war production program, which is the first responsibility of all of us. We are still able to supply parts for all makes and models of warm air furnaces, and, of course, PEERLESS Furnaces are still available on proper priorities.

PEERLESS FOUNDRY CO. 1855 Ludlow Ave., Indianapolis, Ind.

Pioneers in Warm Air Heating for Over a Third of a Century

Sturtevant
MILL EXHAUSTER
LARGE, STREAMLINED INLET MEANS MINIMUM LOSSES DUE TO ENTRANCE FRICTION OR EDDIES
FOR HIGH EFFICIENCY LOW POWER COSTS
B. F. STURTEVANT COMPANY
Hyde Park
Boston, Mass.
Branches in Principal Cities

"Designed and Built by the Pioneer"

ACCURATE DEPENDABLE

MASTER HEAT REGULATOR

TYPE A-23 positive snap action regulator operates on a differential of only ½ degree.

WHITE MFG. CO., 2368 University Ave., St. Paul, Minn.

REPAIR PARTS

for any and all makes of

STOVES—FURNACES—BOILERS

Also MODERNAIRE FURNACES

Fittings, Registers, Supplies

DES MOINES STOVE REPAIR CO.

Sam C. Green
Fred R. Green

DES MOINES, IOWA
Since 1869

Indiana Convention

(*Continued from page* 79)

Prof. Miller expressed the opinion that radiant heating will not maintain its present popularity (this is entirely public clamor for something the public does not understand) but eventually there may come a combination of radiant heating and forced warm air circulation which will overcome most present obstacles.

Prof. Miller cited instances of several of the houses in the Purdue Foundation such as the windowless house where warm air is supplied across the ceiling, down the outside wall and back under the floor with comfort obtained when the air temperature inside is only 60 degrees. Another research house has reflective insulation as the inside surface of each room and an investigation is under way to determine if some small source of heat (maybe even a light bulb) will, by "bouncing back the heat rays," provide sufficient heat for satisfactory comfort.

In this Purdue Foundation program are houses employing six separate heating plants, with warm air panels, forced warm air, and other forms of heat introduction—the purpose being to test all types of heat in a single residence. Investigations are under way as to the relative electric cost for continuous and intermittent blower operation in a forced warm air system and the results of these tests will be released in due time. Other investigations cover zone control and individual room control.

. . . AT YOUR SERVICE . . .

To Help With Your War-Time Soder & Flux Problems

WRITE US TODAY

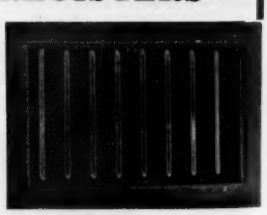
L. B. ALLEN CO., Inc.

6702 Bryn Mawr Ave., Chicago, 31, Ill.

"NON-METALLIC" REGISTERS

FOR DEFENSE PROJECTS

Approved by Government Authorities for air-conditioning installations in Hospitals, Industrial Plants, Fortifications, etc., under Army, Navy or Maritime rulings. Field-tested STANDFORATED Register and Grille designs of durable, tempered Masonite are fabricated in standard sizes or to your specifications. Write for complete information.



DESIGN NM-SLD—"Non-Metallic" Sliding Damper Foundation Vent.

STANDFORATED

FOR PRODUCTION SPEED-UP—

Specify Precision Processed STANDFORATED Perforations. Industrial Screens, Filters, Guards, etc., made to specifications for vital industries. Handy catalog sent on request.

STANDARD STAMPING & PERFORATING CO.

3137 W. 49th PLACE CHICAGO, ILLINOIS

One interesting development reported by Prof. Miller covers the advisability of "blasting" cold walls and windows with warm air reaching the window at a velocity of 250 fpm. Ordinarily, engineering design attempts to "float" the air to the window or wall, permitting the air to drop slowly down the cold surface. By "blasting" the wall surface, this investigation attempts to determine if we can eliminate the effect of cold surfaces and maintain high air velocities above the headline in the room without creating objectionable draft. Somebody asked Prof. Miller if the location and number of return air openings had any effect on the systems in the Foundation and Prof. Miller said his personal opinion was that there did not seem to be any difference in operation with one return or many returns, but he hedged by saying that perhaps closed or open doors might have some effect on the operation.

A Plan for Post War Planning

The post-war discussion was brought to a close by J. D. Wilder, AMERICAN ARTISAN, who proposed a program which contractors may follow in establishing a post-war program for their own use. This discussion is one part of a series of studies currently being published in AMERICAN ARTISAN (the first study covers the distribution of 200,000 replacement furnaces in 1944; the second study in the January issue covers manpower) and accordingly will be reported in more detail with charts in a later issue.

◆

William J. Gowern, 62, representative of McClure-Johnston Co., Pittsburgh, Pa., died January 27th, 1944, at Canonsburg, Pa. Mr. Gowern after graduating from business college in 1899 became associated with the McClure Company and later the McClure-Johnston Company with whom he was connected at the time of his death.

REPAIRS FOR ANY FURNACE BOILER OR STOVE

REPAIR PARTS FOR ANY FURNACES-BOILERS OR STOVES

Complete Line of Sundries and Supplies

FOR QUICK SHIPMENT

OMAHA STOVE REPAIR WORKS

1206-8 DOUGLAS ST., OMAHA 2, NEB.

SINCE 1882

Bremil Two Sizes

PORTABLE SHEARS

Your work will proceed faster and neater when you use Bremil Portable Shears on the job or in the shop. Write today for literature showing complete line.

ALL-ALLOY No. 2 cuts up to ¼" steel plate.
ALL-ALLOY No. 1 cuts up to No. 11 gauge strip or sheet.
Special blades may be obtained for shearing stainless steel

BREMIL MFG. CO., ERIE, PA.

Vernois A GREAT NAME BEFORE . . .
A GREATER NAME AFTER!

Vernois Furnaces were famous for customer satisfaction and dealer profit before the war, they'll be greater than ever after the war!

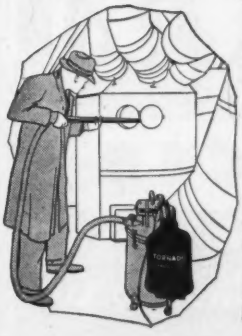
Keep your Vernois installations at top operating efficiency . . . use only genuine Vernois parts in repair work. Order Vernois parts direct from the manufacturer.

MT. VERNON FURNACE & MFG. CO.
MT. VERNON, ILLINOIS

TORNADO FURNACE CLEANERS

Are Still in Demand but Are Not Available

UNTIL AFTER THE WAR



The manufacture of TORNADO Furnace and Boiler Cleaners was, as you doubtless know, discontinued some time ago to make way for "essentials" on which our efforts are now concentrated.

After the war, these Cleaners will resume their rightful place not only for cleaning purposes, but for keeping you in touch with the fuel and stoker needs of your customers.

BREUER ELECTRIC MFG. CO.
5082 Ravenswood Ave., Chicago, Ill.

Repair Parts FOR ALL HEATING UNITS

BRAUER REPAIR PARTS — STOVE, FURNACE, BOILER, OIL STOVE, RANGE

A. G. BRAUER SUPPLY CO.
Distributors of All Heating and Air Conditioning Equipment
2100 Washington Ave. St. Louis, Mo.

CHENEY METAL

The Modern SHEET METAL

- SUPERIOR TO GALVANIZED IRON
- WEATHER PROOF
- FIRE RETARDANT
- MOISTURE PROOF
- FORMS EASILY WITH REGULAR SHOP TOOLS

CHENEY METAL PRODUCTS CO. TRENTON, N.J.

WRITE FOR DESCRIPTIVE FOLDER AND THE NAME OF YOUR NEAREST DISTRIBUTOR

ECON-O-COL
the "Stronghearted"
STOKER

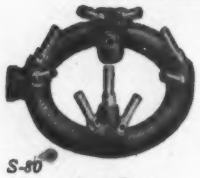
ECON-O-COL Automatic COAL BURNER

ECON-O-COL STOKER DIVISION
COTTA TRANSMISSION CORP.
ROCKFORD ILLINOIS

THE SHIELD OF QUALITY

NiAGARA
GRAVITY AND FORCED AIR
FURNACES
DURABLE • EFFICIENT • DEPENDABLE • ATTRACTIVE
THE FOREST CITY FOUNDRIES CO.
2500 WEST 27TH ST. • CLEVELAND 13, OHIO

BARBER BURNERS
For ALL Gas Appliances


S-80

Z-21

Under wartime stresses of fuel shortages and material scarcities, the economical, continuous, trouble-free performance of gas appliances, now in operation, equipped with Barber Burners, is an outstanding contribution to the war effort. Our factory is now concentrated on combat equipment. For permited purposes, our regular line is still supplied. Later, Barber Burners and Regulators will again be available to all.

Latest Catalog on request.

THE BARBER GAS BURNER CO
3704 Superior Ave., Cleveland, Ohio

Write for Catalog and Prices

SPEED UP ORDERS with a
BEVERLY SHEAR

Throatless shears that cut any shape . . . straight, circular or irregular. FASTER — Precision — accuracy! Order No. 1 for 14 gauge. No. 2 for 10 gauge. No. 3 for 3/16 inch mild steel and 10 gauge stainless.

BEVERLY SHEARS CO.
3000 W 110th Pl., Dept. 1
CHICAGO, ILL.

☆ WAR TIME

Gar Wood Industries, Inc., Detroit, is now producing oil-fired boiler-burner units and water heaters for use aboard ship and specialized forced air heating equipment for the Army and Navy.

The Peerless Foundry Company, 1845-1935 Ludlow Ave., Indianapolis, Indiana, has been working on Government contracts for approximately a year and a half, and even though they have been short of help in all departments, they have endeavored to take care of their regular furnace and furnace repair parts orders.

At a recent election, since the passing of former President T. J. Cornwell, **Frank M. Mutz** was elected his successor and **Harold W. Mutz** was elected to the vice presidency.

The manufacture of Government items has been confined mostly to their Sheet Metal Department, however, some foundry tonnage has been used on these items as well as furnaces and furnace repair parts for Government usage.

Victor Electric Products, Inc., Cincinnati 9, Ohio, reports their buyer—**Richard Krauss**—in the Coast Guard.

The company has contracts for torpedo trucks—20 mm percussion fuzes; after body stands—3 hp. motors for operating feathering pump; test sets—⅓ hp. motors for turret ammunition belt booster; valves and gauge sets. All business consists of war orders.

Victor has added many new major machines and made internal plant changes to take care of this business. The following have replaced men now in service:

T. R. Harris is now Secry. & Gen. Mgr.
Robert Lauer is now personnel director.
Albert McBeth is now methods supervisor.
Paul Kennedy is now planning and scheduling supervisor.
H. Darby is general superintendent.

Eighty-eight former employees are now in service.

L. E. Gaut joins Victor as general sales manager on January 3, 1944, to devote his entire time to postwar planning and market research.—C. L. Harrisen.

Century Engineering Co., Cedar Rapids, Iowa, now working for victory, reports to its dealers and distributors with a 16-page and color, 11 by 14 brochure telling their part in war work with full page illustrations of the Army-Navy "E" Award Ceremonies, the plant and interiors, a history of the company organized in 1926 and its development of an oil-burning device. There are individual pictures of President E. J. Lattner, Vice-President M. D. McWilliams, and Secretary-Treasurer J. A. Lattner.

In January, 1942, the company was awarded a contract for the mass production of critical components of war materials and for aerial bomb fuzes. New machines replaced 99 per cent of the old equipment.

The Honor Roll carries 69 former employees known to be now in service.

Blueprint for Peace

While our machinery spins to turn out the [tools] of war, our drafting rooms and experimental laboratories hum with activity on post-war heating and air-conditioning products. We'll be ready for the post-war period; you can depend on this.

CONCO Automatic PACKAGED HEAT

CONCO CORPORATION
Division of H. D. Conkey & Co.
Mendota, Ill.

TRADE NEWS ☆

Fitzgibbons Boiler Company was awarded the Army-Navy "E" at their Oswego plant on October 29th. President **Homer Addams** received the pennant. Col. Frank J. Atwood, Chief of the Rochester Ordnance District, addressed the assemblage and made the presentation.

Minneapolis-Honeywell Regulator Co., Minneapolis, reports approximately sixty of their former salesmen, engineers and executives are now in the service of the U. S. A.

The company has contracts for fire control instruments for the Ordnance Department; telescopes, periscopes, quadrants and gun-sights for the Navy; and automatic electronic pilots and other secret instruments for the air forces. A good percentage of present manufacturing consists of war orders, although the company is making money on "peacetime" instruments.

Minneapolis-Honeywell has three new plants including one large hanger which in January was housing four 4-engined bombers, two pursuit ships and some training planes. The company operates two Chicago factories, two in Minneapolis, one in Wabash, one in Philadelphia, and has just purchased another in Minneapolis.

Almost all employees are on at least a 10 per cent paycheck withholding plan. More than a thousand employees are in service and many of them have seen action.

Minneapolis-Honeywell has been awarded three Army-Navy "E's."—W. P. Hutchinson, Public Relations.

The Ruby Chemical Company, Columbus 8, Ohio, reports their manufacturing foreman entered the Army and three months later was honorably discharged to resume his civilian employment as it was considered his work was essential.

Many contracts vary in size from a few gallon soldering flux to several thousand gallons and several tons of solder. Approximately 90 per cent of present business consists of war orders.

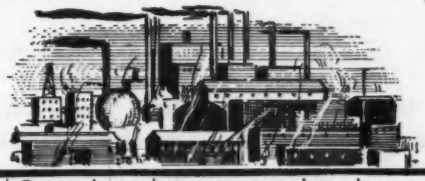
New additions and alterations to the plant were completed December 27th, 1943, which will practically double the output capacity.

Both the company and employees are buying bonds to the full extend of their ability, high cost-of-living and higher taxes being considered.

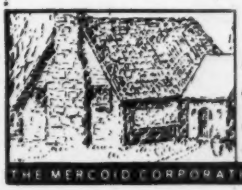
G. C. Baker, secretary, reports a son-in-law in the air force now based in England—a gunner—and a son-in-law in an Engineer Depot.

The company is recognized as an essential industry as evidenced by the fact that their application for a new building and alterations of the old was approved by WPB and made a "Chemical Project Unit" with priorities to obtain necessary materials. The company is producing more "Rubyfluid" products now than ever before in the 36 years of existence, and most of it is going into the war effort in some form.—G. C. Baker, Secretary.

GILCO
Automatic
FURNACES and WATER HEATERS
J. L. GILLEN CO.
DOWAGIAC • • MICH.



Mercoid Control production is now largely confined to industrial types for American industry engaged in essential war work.



WHEN IT'S OVER
—and we again get back to the normal way of life, many more homes will have the opportunity of enjoying automatic heat the Mercoid way of perfect room temperature control with oil heat, coal stokers, etc., on any type of heating plant.

THE MERCOID CORPORATION 4221 BELMONT AVENUE CHICAGO 41

Leader
KOOLSTACK FURNACES
FOR STOKERS
OIL or HANDFIRED
50,000 to 200,000 BTU's
Patented Damper Uses All the Heat in the Added Heating Surface
THAT IS SOMETHING TO SELL

LEADER IRON WORKS, Inc.
Decatur Illinois

ROCK ISLAND
REGISTERS and INTAKES
Two trade marks to remember when you want the height of efficiency, beauty and low cost combined in registers and intakes.
AIR-VANE
NO STREAK
Dealers Net Estimating book, a time and money saver, sent free upon request.
ROCK ISLAND REGISTER CO.
ROCK ISLAND ILLINOIS

ious Patented Monogram Vaporizing Burner
ovides Highest Known Operating Efficiency with Oil

I Forced
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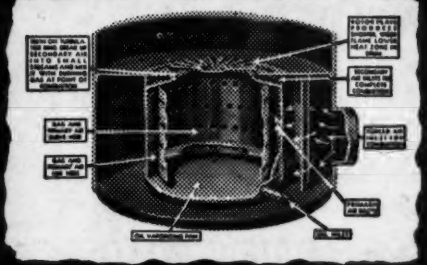
Units



Utility
Room
Units
•
Automatic
Water
Heaters

e QUINCY STOVE MFG. COMPANY, Quincy, Illinois

Drill Holes Faster, Easier

with Black & Decker Electric Drills

¼" Standard Holgun **$32.50**

Models to fit any metalworking job. Capacities from ¼" to 1¼" in steel—double in hardwood. Drive twist drills, wood augers, hole saws, many attachments. Powerful Universal motors. See your Black & Decker Distributor, or write to: The Black & Decker Mfg. Co., 782 Pennsylvania Avenue., Towson-4, Maryland.

Black & Decker

Portable Electric **TOOLS**

DRILLS, HOLE SAWS, DRILL STANDS, LECTRO-SHEARS, BENCH GRINDERS, SANDERS, PORTABLE GRINDERS.

HEIL IS THE NAME TO REMEMBER

for oil burners . . . oil-designed furnaces and boilers *that assure you of:*

- ✓ Satisfied, loyal customers
- ✓ Minimum service trouble
- ✓ Efficient, economical operation
- ✓ Design features that sell
- ✓ Profitable manufacturer-dealer relations

H-1A

HEIL ANSWERS UNCLE SAM'S CALL . . . and helps the Arsenal of Democracy supply materials for Victory!

THE HEIL CO.

GENERAL OFFICES: MILWAUKEE, WISCONSIN

Remember COLE HOT BLAST Gas-Fired FLOOR FURNACES

Will again be on the market after it's over, but now it's war work.

COLE HOT BLAST MFG. CORP.

3108 W. 51st St. Chicago, Ill.

DASCO

ARMY E NAVY

Forged HAND TOOLS

Chisels, punches, drills, nippers and numerous other hand tools . . . quality built for long service. Sold by leading jobbers.

DAMASCUS STEEL PRODUCTS CORP., ROCKFORD, ILL.

Better Home Heating Program

(*Continued from page* 51)

covering liability for property damage or personal injury caused, or claimed to be caused, by The Company or its employees in connection with repair, inspection or cleaning of furnaces or heating systems, or entry of a house or building for purpose of such repair, inspection or cleaning.

9. The Company also understands that it must carry all workmen's compensation and other similar customary insurance covering its employees, and must pay social security, unemployment and other taxes relating to its employees, and will, if requested by the Agent or a particular stockholder-member doing business with it, furnish evidence of such insurance and payment of taxes.

10. Before any work is done by The Company for a customer pursuant to this agreement, The Company shall furnish to Agent a performance bond in favor of Agent and/or any designated stockholder-member or members in the penal sum of $1,000, and conditioned upon satisfactory performance by The Company of all its obligations under this agreement.

11. Agent may at any time upon ten (10) days' notice in writing to The Company, cancel this agreement for default by The Company in any of its obligations hereunder.

IN WITNESS HEREOF, the parties hereto have hereunto put their hands the day and year first above written.

In Presence of: BETTER HOME HEATING, INC., Agent,

..... By.....

.....

.....

The Company

By.....

By.....

SAL-MO ASBESTOS PRODUCTS

QUALITY Asbestos Products for all types of insulation: Papers, Millboards, Pipe Joint Tape, Pipe Coverings for all kinds of steam, hot and cold water lines, Asbestos Cements, Asbestos Ductboard.

SAL-MO SUPPLY DUCT

The popular non-metallic material for constructing Supply and Return Ducts for Warm Air Heating and Air Conditioning Systems.

SALL MOUNTAIN COMPANY

176 W. ADAMS STREET DEPT. K CHICAGO, ILL.

SPOT WELD WITH AN ACME "Hot Spot" WELDER

Proven utility for over 26 years in thousands of sheet metal fabricating plants.

Write for Literature and Prices.

Complete Range of Sizes

Lifetime Guarantee!

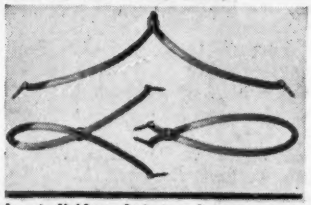
ACME ELECTRIC WELDER CO.

2618B Fruitland Road Los Angeles, Calif.

AMERICAN ARTISAN Service Section

Will Cut Soldering Costs In Half
No More Changing of Irons

Always the Right Amount of Heat for the lightest as well as the heaviest jobs. Especially adaptable for soldering with Victory Solder.



Quick set dividers—fastest and most accurate on the market—two sizes for circles up to 36" and 48". Guaranteed—Order now.

REINER & CAMPBELL CO., Inc.
667 Norwood Terrace, Elizabeth, N. J.

Save Money, Time and Muscle

Drill Concrete with the "Do-All" Combination Electric Hammer and Drill. Set expansion bolts 10 to 20 times faster than with hand tools. Drills concrete, brick, stone, metal, wood. Easy to maintain. Weighs 15 lbs. Drills to 1¾" in concrete. 2400 blows per min. Bulletin 400. Phone Austin 9866.

WODACK ELECTRIC TOOL CORPORATION
4644 W. Huron St., Chicago, Ill.

SERVICE SECTION: Rates for display space in the Service Section are $5.00 per inch per insertion. One-inch minimum space accepted.

Classified Section: Rates for classified advertising are 5 cents for each word including heading and address. Count seven words for keyed address. Minimum $1.00 for each insertion. Cash must acompany order.

QUICK DELIVERY

BRAKES
POWER: 10'10 ga., 8'14 ga., 6'12 ga., 6'14 ga.
HAND: 10'16, 10'18, 8'16, 8'18, 6'14, 6'18, 5'18, 3'16 ga.—8'18 ga. WHITNEY.

FOLDERS
36", 30", 20" PEXTO & NIAGARA.
60" NIAGARA POWER PIPE FOLDER.

MILLS
PLAIN: Nos. 5, 4, 3, & 2 CINCINNATI; No. 2-S & 2-B K&T, Double Overarm.
VERTICALS: No. 5-B BECKER; Nos. 2&3 BROWN & SHARP; No. 2½B K&T.
UNIVERSALS: No. 3 B&S; Nos. 1½ & 3 CINC.; Nos. 1 & 2 KEMPSMITH.
No. 1½ HENDEY NORTON.

PUNCHES
HAND: No. 10 EXCELSIOR, 19" throat; No. 56 Niagara, ¼" thru ⅛"; No. 40 WHITNEY, 5/18" thru ½".
DEEP THROAT: No. 15 TOLEDO; No. 20 EXCELSIOR; No. 135-A NIAGARA.

PRESS BRAKES
5'14 ga. OHL; Nos. 335, 255 & 254 CHGO STEEL; 10' POORMAN.

ROLLS
POWER: 12' HILLES JONES, ⅝" capacity; ANGLE: 6x6x¾" WICKES.
LEVELLER: 5' NILES, 7 Rolls, 6¼" dia.

SHEARS
12'16 ga., 10'3/16", 8'14 ga. CHICAGO STEEL; 10'3/16" OHL; 10' 14 ga. BERTSCH; 10'18 ga. PEXTO; 10'16 ga. OHL.
POWER GAP: 5'16 ga. WAIS & ROOS; 4'10 ga. BERTSCH.
FOOT: 8'20 ga. CHICAGO STEEL; 36" NIAGARA; 30" BERTSCH.
RING & CIRCLE: No. 510 Niagara, ⅝" Cap., Back geared, Motor driven; QUICKWORK 5/32" shear, ⅛" flang.
ROTARY: 14 ga. QUICKWORK & YODER.

SPOT WELDERS
250 KVA FEDERAL, 50 KVA SWIFT, 20 & 30 KVA GIBB, PRESS TYPE; 20 KVA THOMPSON; 10 KVA TAYLOR; 10, 13 & 15 KVA AEF.

MISCELLANEOUS ITEMS
No. 737 PEXTO FOOT NOTCHER.
No. 0 GRAY NIBBLER, ⅛" throat.

"SEND FOR CATALOG."

INTERSTATE MACHINERY CO., INC. YARDS 5800
1433 W. PERSHING RD., CHICAGO 9, ILL.

Better for Every Spraying Purpose

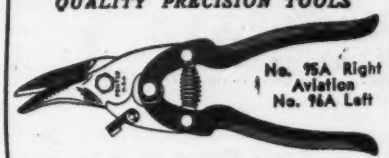
MARLEY SPRAY NOZZLES

"Tops" for Air Washing, Humidifying, Brine Spray Lofts, etc. Marley nozzles lead all in sales and in profits to you.

*Finer, more uniform spray.
*Effective operation at Low Pressures. *No internal parts to clog or wear.

MARLEY CO., INC. Write for Literature Now! Kansas City, Kansas

NEW Improved PENTCO
Compound Action AVIATION—SHEET METAL and ELECTRICIAN SNIPS
QUALITY PRECISION TOOLS



No. 95A Right Aviation
No. 96A Left

Maximum power, minimum effort.
Combination, Right and Left, No. 185-190-195.
Blades made from alloy steel. Hardened and tempered for rough use. Will cut with ease all grades of steel. Side locking feature that will not interfere with cutting blades.
Case hardened bolts.
IMMEDIATE DELIVERY
Write for Circular

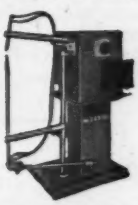
PENN TOOL CO.
2415 N. Howard St., Philadelphia, Pa.

FANS BLOWERS EXHAUSTERS
"Lungs for Industry"

REBUILT and GUARANTEED
Prompt Shipments From Large Stocks
All Types—All Makes—All Sizes
And We Really Rebuild 'Em
Why Wait Months for New?

GENERAL BLOWER CO.
Phones: MONroe 0244
403 NORTH PEORIA ST.
CHICAGO 22, ILL.

WELDING HEADQUARTERS



Electric welding equipment of every description to weld from a watch case to a door. Special or standard SPOT WELDERS from ¼ to 500 K.V.A. A.C. Arc Welders from 100 to 400 Amps. We invite contract Spot Welding in large or small quantities.

EISLER ENGINEERING CO.
CHAS. EISLER
781 S. 13th St. (Near Avon Ave.) Newark, N. J.

Trademark
YAGER'S Soldering Salts — Paste
Reg.
Two standard fluxes for all soft soldering. Safe, quick, certain. Buy them at your jobbers or write us if he cannot supply you.
½ lb., 1 lb., 5 lb. cans; 2 oz., 6 oz., 12 oz
ALEX. R. BENSON CO., INC., HUDSON, N. Y.

GRAND RAPIDS FURNACE CLEANERS
Write for Details
DOYLE VACUUM CLEANER CO.
227 Stevens St., S.W.
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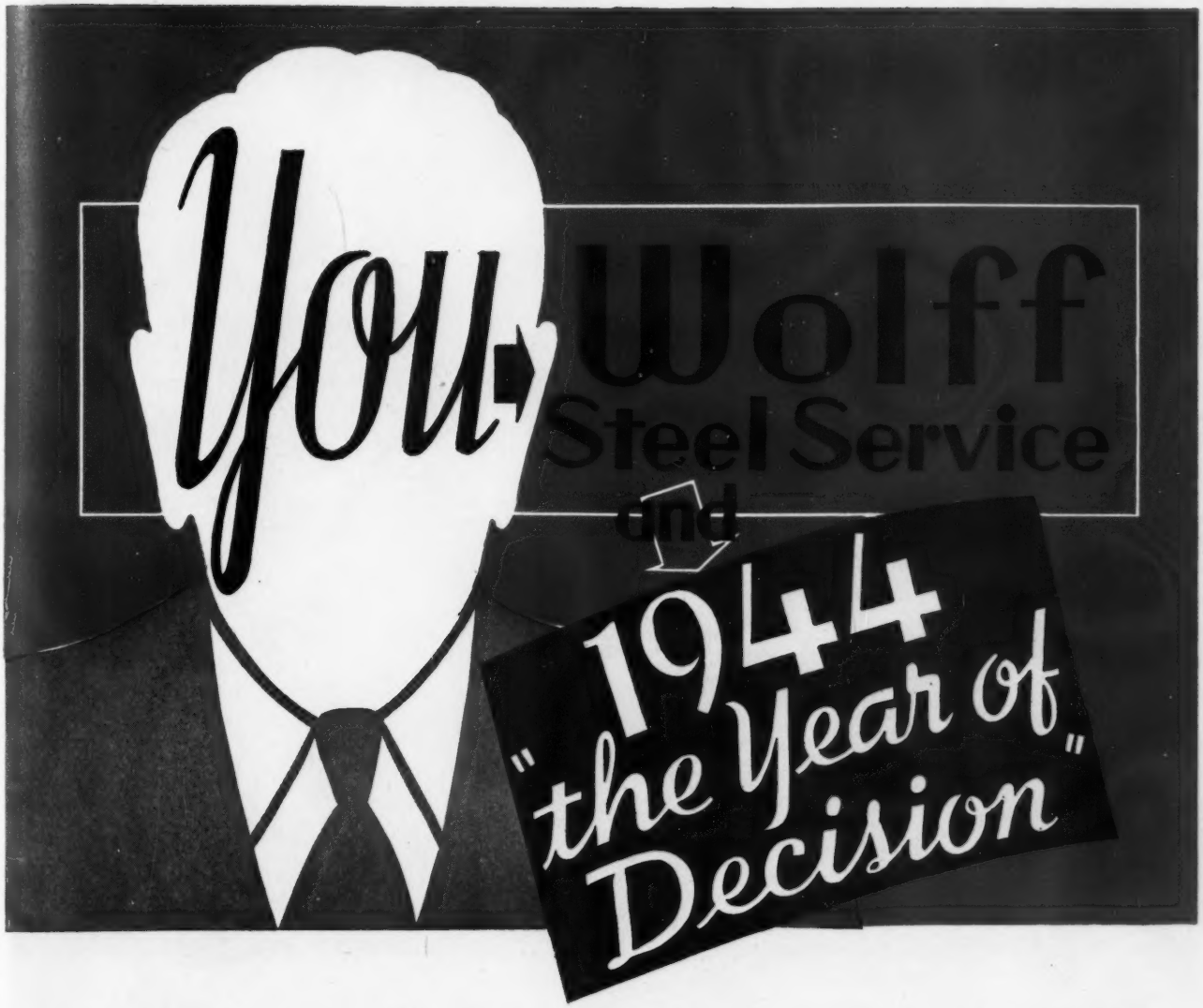

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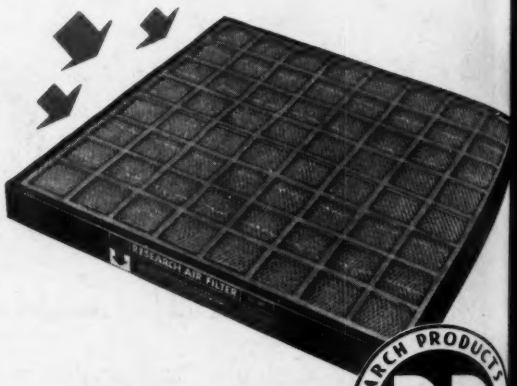

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